

072-17027

NASA SP-7011 (95)



**CASE FILE
COPY**

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY

WITH INDEXES

(Supplement 95)

NOVEMBER 1971

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges:

STAR (N-10000 Series) N71-31601—N71-34000

IAA (A-10000 Series) A71-37071—A71-39968

This bibliography was prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by Informatics Tisco, Inc.

Use of funds for printing this publication approved by the Director of the Office of Management and Budget June 23, 1971.

NASA SP-7011 (95)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
WITH INDEXES

(Supplement 95)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Scientific and Technical Information System during October 1971.



Scientific and Technical Information Office

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON, D.C.

NOVEMBER 1971

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, *Aerospace Medicine and Biology* (Volumes I–XI) should be directed to NTIS.

This Supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22151 for \$3.00.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* (NASA SP-7011) lists 311 reports, articles, and other documents announced during October 1971 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964; since that time, irregular supplements have been issued.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied by an abstract. The listing of the entries is arranged in two major sections: *IAA Entries* and *STAR Entries*, in that order. The citations and abstracts are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. This procedure, which saves time and money, accounts for the slight variation in citation appearances.

Two indexes—subject and personal author—are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1971 Supplements.

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A71-10000 Series)

All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies are available at \$5.00 per document up to a maximum of 20 pages. The charge for each additional page is 25 cents. Microfiche⁽¹⁾ are available at the rate of \$1.00 per microfiche for documents identified by the # symbol following the accession number. A number of publications, because of their special characteristics, are available only for reference in the AIAA Technical Information Service Library. Minimum airmail postage to foreign countries is \$1.00. Please refer to the accession number, e.g., A71-10613, when requesting publications.

STAR ENTRIES (N71-10000 Series)

A source from which a publication abstracted in this Section is available to the public is ordinarily given on the last line of the citation, e.g., Avail: NTIS. The following are the most commonly indicated sources (full addresses of these organizations are listed at the end of this introduction):

Avail: NTIS. Sold by the National Technical Information Service at a standard price of \$3.00 for hard copy (printed, facsimile, or reproduced from microcopy) of 300 pages or less. Documents in the 301 to 600 page range are sold for \$6.00 in hard copy, and those in the 601 to 900 page range are sold at \$9.00. Documents exceeding 900 pages are priced by NTIS on an individual basis. These prices apply retroactively to all documents in the NTIS collection, but in addition, documents of 300 pages or less that are over two years old (from date of announcement in *Government Reports Announcements*, or *STAR* for those items announced only in *STAR*) will have a surcharge of \$3.00 added for a total price of \$6.00. No additional surcharge will be added for documents over 300 pages.

Microfiche is available from NTIS at a standard price of 95 cents (regardless of age) for those documents identified by the # sign following the accession number (e.g., N71-10411#) and having an NTIS availability shown in the citation.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The price is given following the availability line. (An order received by NTIS for one of these documents will be filled at the SOD price if hard copy is requested. NTIS will also fill microfiche requests, at the standard 95 cent price, for those documents identified by a # symbol.)

Avail: NASA Scientific and Technical Information Office. Documents with this availability are usually news releases or informational brochures available without charge in paper copy.

Avail: AEC Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of U.S. Atomic Energy Commission reports, usually in microfiche form, are listed in *Nuclear Science Abstracts*. Services available from the USAEC and its depositories are described in a booklet, *Science Information Available from the Atomic Energy Commission* (TID-4550), which may be obtained without charge from the USAEC Division of Technical Information.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts*, and are sold by University Microfilms as xerographic copy (HC) at \$10.00 each and microfilm at \$4.00 each, regardless of the length of the manuscript. Handling and shipping charges are additional. All requests should cite the author and the Order Number as they appear in the citation.

(1) A microfiche is a transparent sheet of film, 105 x 148 mm in size, containing up to 72 pages of information reduced to micro images (not to exceed 20:1 reduction).

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by British Information Services (BIS), New York City. The U.S. price (including a service charge) is given, or a conversion table may be obtained from BIS.

Avail: National Lending Library, Boston Spa, England. Sold by this organization at the price shown. (If none is given, an inquiry should be addressed to NLL.)

Avail: ZLDI. Sold by the Zentralstelle für Luftfahrtokumentation und -Information, Munich, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent Office. Sold by Commissioner of Patents, U.S. Patent Office, at the standard price of \$.50 each, postage free.

Other availabilities: If the publication is available from a source other than the above, the publisher and his address will be displayed entirely on the availability line or in combination with the corporate author line.

GENERAL AVAILABILITY

All publications abstracted in this bibliography are available to the public through the sources as indicated in the *STAR Entries* and *IAA Entries* sections. It is suggested that the bibliography user contact his own library or other local libraries prior to ordering any publication inasmuch as many of the documents have been widely distributed by the issuing agencies, especially NASA. A listing of public collections of NASA documents is included on the inside back cover.

SUBSCRIPTION AVAILABILITY

This publication is available on subscription from the National Technical Information Service (NTIS). The annual subscription rate for the monthly supplements, excluding the annual cumulative index, is \$10.00. All questions relating to the subscriptions should be referred to the NTIS.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics
and Astronautics
Technical Information Service
750 Third Ave.
New York, N.Y. 10017

British Information Service
845 Third Ave.
New York, N.Y. 10022

Commissioner of Patents
U.S. Patent Office
Washington, D.C. 20231

ESRO/ELDO Space Documentation Service
European Space Research Organization
114, av de Neuilly
92-Neuilly-sur-Seine, France

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information
Facility
P.O. Box 33
College Park, Maryland 20740

National Aeronautics and Space
Administration
Scientific and Technical Information
Office (KSI)
Washington, D.C. 20546

National Lending Library for Science
and Technology
Boston Spa, Yorkshire, England

National Technical Information Service
Springfield, Virginia 22151

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Atomic Energy Commission
Division of Technical Information
P.O. Box 62
Oak Ridge, Tennessee 37830

Zentralstelle für Luftfahrt-doku-
mentation und -Information
8 München 86
Postfach 880
Federal Republic of Germany

TABLE OF CONTENTS

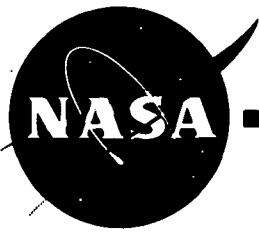
	Page
IAA Entries (A71-10000)	511
STAR Entries (N71-10000)	535
Subject Index	I-1
Personal Author Index	I-35

TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT		AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER	N71-11094*#	CORPORATE SOURCE
TITLE	Yeshiva Univ., New York. A STUDY OF THE STABILITY OF SLEEP PATTERNS IN YOUNG ADULTS FOR SEQUENTIAL NIGHTS OVER A THREE WEEK PERIOD Final Report, 15 Jun. 1968-15 Jun. 1970	PUBLICATION DATE
AUTHOR	Elliot D. Weitzman 15 Jun. 1970 27 p refs (Grant NGR-33-023-032)	AVAILABILITY SOURCE
CONTRACT OR GRANT	(NASA-CR-111519) Avail: NTIS CSCL06P	COSATI CODE
REPORT NUMBER	In the study reported each subject had a three week baseline nocturnal sleep period, followed by three weeks of sleep during the day, followed by a re-inversion period of three weeks sleeping at night. The data obtained from these studies are described. Author	

TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORSHIP		AVAILABLE ON MICROFICHE
AIAA ACCESSION NUMBER	A71-10513 * #	AUTHORS
TITLE	Influence of perturbing effects on a manual rendezvous system. Alan M. Schneider, Howard M. Koble, and Eric T. Wilson (California, University, La Jolla, Calif.). In: The role of man in navigation; Institute of Navigation, Anniversary Year Meeting, 25th, U.S. Air Force Academy, Colorado Springs, Colo., July 1-3, 1970, Proceedings. (A71-10501 01-21) Washington, D.C.,	AUTHORS' AFFILIATION
TITLE OF PERIODICAL	Institute of Navigation, 1970, p. 212-252. 6 refs. Grant No. NGR-05-009-106.	PUBLICATION DATE
	A system for navigation, guidance, and control of a spacecraft to rendezvous with an orbiting target, based entirely on observations by handheld, unpowered instruments, and computations done entirely by hand, has been developed. This paper describes results of an interactive digital simulation of this system through a selected set of rendezvous missions. A previously reported study to evaluate the influence of error sources on the system is extended to two new test cases. In addition, several perturbing influences not covered heretofore are examined, specifically: errors in the method of star sight averaging made to compensate for nonsimultaneity of a pair of sightings, incorrect knowledge of the interceptor spacecraft's orbital period, and astronaut computation error. An activity chart is included which shows the apportionment of two astronauts' time in carrying out rendezvous using the manual system. It is shown that rendezvous is achieved on all error missions without undue increase in fuel and/or time relative to an 'error-free' mission. (Author)	CONTRACT, GRANT, OR SPONSORSHIP



AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 95)

NOVEMBER 1971

IAA ENTRIES

A71-37231 **Design and first results of a new phonocardiograph.** Aldo A. Luisada, Donald M. MacCanon, Larry P. Feigen, Paul M. Griffen, and Bernard Darrel (GE Research and Development Center, Schenectady, N.Y.; University of Health Sciences, Chicago, Ill.). *American Journal of Cardiology*, vol. 28, Aug. 1971, p. 134-139. Research supported by the Fannie Rippel Foundation; NIH Grant No. HE-09350.

This paper describes the technical components of a new calibrated phonocardiograph for tracings of displacement, velocity and acceleration. Many possible laboratory and clinical applications of the new apparatus are listed, and representative tracings are presented to show the versatility of the new system. (Author)

A71-37232 **New studies on the first heart sound.** Aldo A. Luisada, Donald M. MacCanon, Bernell Coleman, and Larry P. Feigen (University of Health Sciences, Chicago, Ill.). *American Journal of Cardiology*, vol. 28, Aug. 1971, p. 140-149. 33 refs. Research supported by the Fannie Rippel Foundation; NIH Grant No. HE-09350.

Recent studies demonstrate that the second component of the first heart sound coincides with the opening of the aortic valve, and relate it to the dynamic changes resulting from this event. They show that the vibrations of this second component are larger and have a higher frequency in the outflow tract of the left ventricle in comparison with the main chamber. Other studies have compared the amplitude of the first sound recorded within the left ventricle with that recorded either on the skin or over intermediate layers. The conclusion is that an average loss of 30 dB is present. However, this loss is greater for lf than for hf vibrations. Changes of the first sound are discussed. They occur in experimental or clinical conditions as a result of changes in the power or rapidity of contraction of the left ventricle. Usually a change in frequency is noted on auscultation as a change in intensity. Blood dilatation or wall hypertrophy can also modify the first heart sound. M.M.

A71-37233 **The second heart sound in normal and abnormal conditions.** Aldo A. Luisada (University of Health Sciences, Chicago, Ill.). *American Journal of Cardiology*, vol. 28, Aug. 1971, p. 150-161. 56 refs.

Changes of the second heart sound are caused by shifting in position and changes in magnitude of the aortic or pulmonary component, or both. Differences in the magnitude of each com-

ponent are primarily related to changes in pressure but are also affected by structural changes of the vascular walls. Positional changes are influenced by the time of closure of the respective valve and by the interval between valve closure and vascular vibration at the time of rebound. Normal splitting is present during inspiration and decreases or disappears during expiration. Marked differences related to age are present. Three abnormalities may occur: wide splitting during inspiration that persists during expiration; single second sound; and reverse splitting, either occurring only during, or accentuated by, expiration. M.M.

A71-37234 **A simple method of recording heart sounds and murmurs.** Denis Abelson and David Bernbaum (Pennsylvania, University, Philadelphia, Pa.). *American Journal of Cardiology*, vol. 28, Aug. 1971, p. 191-196. 11 refs.

A new technique (frequency phonocardiography) is described for the graphic registration of heart sounds and murmurs. With use of a zero-crossing detector, an analog voltage is developed proportional to frequency. Advantages of the method include clarity of presentation, ease of measurement of time intervals and suitability for mechanical recorders. (Author)

A71-37250 **Unsymmetrical diffusion along the nerve path as a model of synopsis activity (Unsymmetrische Diffusion längs der Nervenbahn als Modell der Synapsentätigkeit).** Franz Ollendorff (Technion - Israel Institute of Technology, Haifa, Israel). *Archiv für Elektronik und Übertragungstechnik*, vol. 25, July 1971, p. 352-356. 8 refs. In German.

The integral operating mode of a nerve path is represented by a linear diffusion channel in which electrochemically active synapses are implanted at regular intervals. Depending upon their polarity the synapses either promote or inhibit the diffusion of uniformly charged ions. The resultant dual nerve types are described by a pair of complementary, partial differential equations which are derived on the basis of the statistics of unsymmetrical diffusion phenomena. In the case of promoted diffusion the physiological signal triggered at the origin by a Dirac stimulus which is above the threshold level reaches the nearest synopsis with an intensity that is again above threshold level. G.R.

A71-37274 * # **Configuring the orbital centrifuge systems for space shuttle compatibility.** J. E. Stumm (General Dynamics Corp., Convair Aerospace Div., San Diego, Calif.) and H. G. Hausch (NASA, Langley Research Center, Hampton, Va.). *American Institute of Aeronautics and Astronautics and Aerospace Medical Association, Weightlessness and Artificial Gravity Meeting, Williamsburg, Va., Aug. 9-11, 1971, AIAA Paper 71-860*. 10 p. Members, \$1.50; nonmembers, \$2.00. Contract No. NAS 1-9904.

Comparative evaluation of various approaches by which the

space-shuttle orbiter may be equipped to provide the necessary experiment environment. These approaches, or experiment performance options (EPOs), were selected from a series of artificial gravity experiment conceptual designs. In defining these EPOs, particular emphasis has been placed on centrifuge applications so as to underscore the relationship of this very versatile system to other methods of experiment implementation. In the final analysis, the orbital centrifuge has proved to be a complementary rather than a competitive device with respect to total vehicle rotation in the study of artificial-g/zero-g phenomena. It is pointed out that no single device or configuration appears capable of providing the complete range of the experiment environment currently considered necessary. Accordingly, the ideal experiment facility may be expected to incorporate a mix of inertial devices in which the orbital centrifuge will be an essential element. M.M.

A71-37275 * # Human psychomotor performance in a rotating environment as measured by the Langley complex coordinator and the decision response time devices. H. G. Hausch, G. V. Maraman (NASA, Langley Research Center, Hampton, Va.), J. L. Peacock, and J. A. Green (North American Rockwell Corp., Space Div., Downey, Calif.). *American Institute of Aeronautics and Astronautics and Aerospace Medical Association, Weightlessness and Artificial Gravity Meeting, Williamsburg, Va., Aug. 9-11, 1971, AIAA Paper 71-887*. 7 p. Members, \$1.50; nonmembers, \$2.00.

Psychomotor performance of four subjects was measured by the Langley Complex Coordinator (LCC) and the Decision Response Time (DRT) devices in a rotating environment on the North American Rockwell Rotational Facility. Twelve tests of single-day exposures to 3, 4, and 5 rpm, and two tests of 3-day and 7-day continuous exposures to rotation at 4 rpm were conducted. The LCC test was performed at a radius of 75 feet with the subjects aligned with the resultant-g vector. The DRT test was performed at test stations at radii of 30 and 78 feet with the subjects' long-body axes aligned with the artificial-g vector. The DRT test was also performed at the nonrotating hub with the subjects seated in the normal vertical position. Analyses of variance were performed on the performance scores. Changes in performance attributable to the rotating environment were minor. Slight degradation in performance due to initial subjects' introduction to rotation and ultimate reestablishment of baseline performance as a result of adaptation to rotation were observable. (Author)

A71-37282 # Impulse blocking by an inhomogeneity in an electrochemical model of a nerve (Blokirovanie impul'sa neodnorodnost'iu v elektrokhimicheskoi modeli nerva). V. G. Levich, N. G. Mazur, and V. S. Markin (Akademiia Nauk SSSR, Institut Elektrokhimii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 198, June 11, 1971, p. 1214-1216. 8 refs. In Russian.

Investigation of the motion of an activation impulse in an inhomogeneous Lillie model of a nerve. The Lillie model consists of an iron wire in a tube containing caustic nitric acid. An attempt is made to ascertain the conditions under which an activation impulse is blocked by an inhomogeneity in a system containing a jump-like inhomogeneity and in a modified system containing an inhomogeneity with an electrochemically inert gap, in which unilateral conductivity is observed. A.B.K.

A71-37283 # Measurement of the time required to react to the appearance and disappearance of short sensory (auditory) stimuli for the purpose of measuring the duration of perception (Izmerenie vremeni reaktsii na poivlenie i ischeznoenie kratkikh sensornykh /slukhovnykh/ stimulov s tsel'iu izmereniia dlitel'nosti oshchushcheniia). S. N. Gol'dburg and P. O. Makarov (Leningradskii Gosudarstvennyi Universitet, Leningrad, USSR). *Akademiia Nauk SSSR*

Doklady, vol. 198, June 11, 1971, p. 1235-1238. 16 refs. In Russian.

Study of the time required for human subjects to respond to the start and cessation of tonal stimuli. It is found that the time required to react to the cessation of a tonal stimulus exceeds the time required to react to the start of such a stimulus by hundreds of milliseconds. It is concluded that the difference between the times required to react to the start and cessation of a sensory stimulus can be used as a measure of the duration of perception. A.B.K.

A71-37299 Cosmic ray flashes in the eye. I. R. McAulay (Trinity College, Dublin, Ireland). *Nature*, vol. 232, Aug. 6, 1971, p. 421, 422.

Demonstration that the light flashes observed in the eye of the Apollo astronauts during lunar flights and which have been interpreted by Fazio et al. (1970) as Čerenkov radiation, can also be interpreted as scintillations produced in the eye lens by the passage of multiply charged cosmic rays. It has been found in experiments that scintillations are produced by alpha particles of 5.3 MeV in eye lenses from freshly killed bullocks. Light from these scintillations is distributed over the whole interior of the eyeball and it is necessary to postulate some focusing mechanism for some of this light to account for the point flashes reported by astronauts. The water-air interface at the front surface of the cornea will act as a partially reflecting concave mirror for light coming from within the eye. When the eyelid is not in optical contact with the cornea, the percentage of light reflected back into the eye is about 2% and scintillations in the lens will be focused to give an image on the retina. M.M.

A71-37308 # Structural arrangement for a biological laboratory in a space station and brief description of a research program on the physiopathology of man in space (Schema di strutturazione di un laboratorio biologico in una stazione orbitale e cenni di un programma di ricerche sulla fisio-patologia dell'uomo nello spazio). Tomaso Lomonaco (Roma, Università, Rome, Italy). In: *Prospects in the next decade for the use of orbiting stations and space shuttles; Technical and Scientific International Space Convention*, 11th, Rome, Italy, April 1-3, 1971, Proceedings (Prospettive nel prossimo decennio per la utilizzazione delle stazioni orbitali e delle navette spaziali; Convegno Internazionale Tecnico-Scientifico sullo Spazio, 11th, Rome, Italy, April 1-3, 1971, Atti). Convention sponsored by the Ministero degli Affari Esteri and the Associazione Industrie Aerospaziali. Rome, Rassegna Internazionale Elettronica Nucleare e Teleradiocinematografica, 1971, p. 129, 131-139. In Italian.

Suggestion of the various biological and medical activities which are assumed to be needed in a space station. Such a biological laboratory should consist of several departments, some of which might be as follows: (1) department of respiratory physiology and physiopathology; (2) department of physiology and pathology of the cardiovascular tract; (3) hematological department; (4) department for the study of static and dynamic equilibrium; (5) department for the study of neuropsychic conditions; (6) dietetic department; (7) radiobiological department; and (8) hygiene and prophylaxis department. M.M.

A71-37392 # Correlation of the activity of adjacent neurons of the somatosensory zone of the cat cortex (Vzaimootnoshenie aktivnosti sosednikh neuronov somatosensornoj zony kory koshki). P. V. Mel'nichuk (Pervyi Moskovskii Meditsinskii Institut, Moscow, USSR) and A. V. Zav'ialov (Kurskii Meditsinskii Institut, Kursk, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 198, June 21, 1971, p. 1471-1473. 15 refs. In Russian.

Analysis of the activity of pairs of adjacent neurons in the brain cortex of cats to determine the role of the background activity level of nerve elements in correlations between them. By studying the distribution of same-direction (cophase) and different-direction

(counterphase) oscillations of background rhythmic, a certain consonance in the work of neighboring neurons is noted. With an increase in the interimpulse interval of a neuron pair the cophasality index decreases and the counterphasality index increases. The counterphase activity oscillations of neighboring neurons may be due to the fact that one element undergoes alleviating effects and the other element inhibiting effects, with the two types of effects being coupled with respect to intensity. A.B.K.

A71-37393 # Dynamics of noradrenaline concentration in the myocardium of rats subjected to high-altitude hypoxia (Dinamika kontsentratsii noradrenalina v miokarde krysi pri vysotnoi gipoksii). M. G. Pshennikova (Akademiia Meditsinskikh Nauk SSSR, Moscow, USSR) and B. M. Manukhin (Akademiia Nauk SSSR, Institut Biologii Razvitiia, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 198, June 21, 1971, p. 1474-1477. 16 refs. In Russian.

Study of the state of sympathetic regulation of the heart in the presence of hyperfunctioning and hypertrophy caused by high-altitude hypoxia. For this purpose a determination is made of the dynamics of the noradrenaline concentration and content in the myocardium of rats exposed to intermittent high-altitude hypoxia produced by placing the animals in a pressure chamber. It is found that during the action of high-altitude hypoxia with pronounced development of hypertrophy of the myocardium the concentration and content of the sympathetic mediator noradrenaline in the myocardium undergo changes which differ from the changes occurring during hypertrophy caused by heart defects. A.B.K.

A71-37413 The activity of single trochlear nerve fibers during eye movements in the alert monkey. A. F. Fuchs and E. S. Luschei (Washington, University, Seattle, Wash.). *Experimental Brain Research*, vol. 13, no. 1, 1971, p. 78-89. 14 refs. NIH Grant No. RR-00166; PHS Grant No. R 01-NB-08596-01.

The firing frequency of 31 single fibers in the trochlear nerve of alert monkeys was related to eye movement. Monkeys were conditioned to finger press lighted buttons in order to produce a calibrated sequence of eye movements in the horizontal and vertical directions. About 3 msec prior to and during a downward saccade, all units exhibited an intense burst in firing frequency. The average maximum burst frequency was about 400 spikes/sec. Prior to and during an upward saccade, all units exhibited a marked decrease in firing rate. If the downward deviation of the eye exceeded a certain minimum position (threshold), all units exhibited a very regular tonic rate during the fixation pauses between saccades. The activity of simian trochlear fibers is very similar to the activity of neurons in the abducens and oculomotor nuclei. Therefore, one functional type of motoneuron which subserves saccadic, smooth pursuit and fixation eye movements exists in all of the oculomotor nuclei. M.M.

A71-37443 # Functional significance of primary responses in subcortical visual centers (O funktsional'nom znachenii pervichnykh otvetov podkorkovykh zritel'nykh tsentrov). I. A. Shevelev (Akademiia Nauk SSSR, Institut Vysheii Nervnoi Deiatel'nosti i Neurofiziologii, Moscow, USSR). *Zhurnal Vysheii Nervnoi Deiatel'nosti*, vol. 21, May-June 1971, p. 569-576. 19 refs. In Russian.

A parallel study of primary responses (PR) and unit spike activity at two subcortical levels of the visual system (i.e., in the optic tract and the lateral geniculate body) in nonanaesthetized cats shows that the form of tract PR and of lateral geniculate body PR coincides well with the distribution of units at these levels by response latencies. However, total time of initial cell activity considerably exceeds the duration of corresponding response phases. The possible causes of this discrepancy are discussed. The data obtained suggest the possibility that the evoked potentials of the two

investigated levels in the cat's visual system may represent a highly accurate quantitative criterion for the properties and behavior of large neuronal populations during the initial period following photic stimulation of the retina. M.V.E.

A71-37444 # Characteristics of threshold electric phosphene (K voprosu o kharakteristike porogovogo elektricheskogo fosfena). V. I. Shostak. *Zhurnal Vysheii Nervnoi Deiatel'nosti*, vol. 21, May-June 1971, p. 586-591. 9 refs. In Russian.

Investigation of the dependence of the duration of the threshold electric impulse on the latter's various electric characteristics for different electric stimulation frequencies, and study of the interrelation between threshold intensity and electric stimulation frequency for various impulse durations. The results of the study include the finding that the dependence varies with the way of estimating the threshold value. When the threshold is characterized by voltage and power of the electric impulse, the dependence is of a hyperbolic and parabolic shape for different frequencies, while for threshold values of energy and amount of electricity the dependence is close to a rectilinear shape. M.V.E.

A71-37445 # Changes in human EEG during mental visualization of motions (Izmeneniia EEG cheloveka pri myslennom predstavlenii dvizheniia). M. P. Ivanova and A. V. Artemov (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Fizicheskoi Kul'tury, Moscow, USSR). *Zhurnal Vysheii Nervnoi Deiatel'nosti*, vol. 21, May-June 1971, p. 624-626. 7 refs. In Russian.

Experiments with human subjects indicate that mental visualization of one's own motions produces EEG changes analogous to those resulting from actual motion performance and activates the motor analyzer. By contrast, when motions of another person are mentally visualized, it is the visual analyzer that is activated the most. M.V.E.

A71-37446 # Methodology of mental work capacity investigation (K metodike issledovaniia umstvennoi rabotosposobnosti). R. M. Baevskii and V. I. Kudriavtseva. *Zhurnal Vysheii Nervnoi Deiatel'nosti*, vol. 21, May-June 1971, p. 638-640. 8 refs. In Russian.

The merits and drawbacks of several methods for studying mental work capacity are discussed. Among the techniques briefly reviewed are those of Kekchev (1947), Kosilov (1957), Zinchenko et al. (1964), and Pratushevich (1964), as well as one of Kraepelin's (1898) mental tests. M.V.E.

A71-37447 # Investigation of motor reaction parameters (Issledovanie parametrov dvigatel'noi reaktsii). I. D. Kartsev, S. A. Polievskii, and G. A. Polievskii (Ministerstvo Zdravookhraneniia SSSR, Institut Gigieny Detei i Podrostkov, Moscow, USSR). *Zhurnal Vysheii Nervnoi Deiatel'nosti*, vol. 21, May-June 1971, p. 641-644. 17 refs. In Russian.

Study of some characteristics of higher nervous activity, using a modified version of the logokinetic method of Ivanov-Smolenskii (1933). Conducted in Pavlovian terms, the investigation is aimed at defining the nature of the interrelation of such indices of conditioned motor reactions as the latent period, the reaction intensity, and the reaction duration. The results obtained confirm the findings of other investigators to the effect that reaction duration, reaction intensity, and latent period are not interrelated. This indicates the necessity of viewing them as separate indices characterizing higher nervous activity independently from each other, as well as the need of simultaneously measuring each of them with adequate accuracy. The described method represents one of the techniques applicable to such measurements. M.V.E.

A71-37483 **The application of heat stress indices.** Clark M. Humphreys (U.S. Public Health Service, Bureau of Occupational Safety and Health, Cincinnati, Ohio). (*Southeastern Industrial Health Conference, Gatlinburg, Tenn., Sept. 30-Oct. 2, 1970.*) *Journal of Occupational Medicine*, vol. 13, Aug. 1971, p. 377-379. 7 refs.

Discussion of some of the variables and uncertainties involved in heat stress evaluations. It is suggested that the best way to discourage a literal interpretation of a heat stress index is to consider some of the assumptions and possible errors inherent in the solution, the major unknown probably being the workman himself. It is shown that the performance of a worker under stressful conditions will vary with the degree of acclimatization, the degree of dehydration, clothing, age, physical fitness, general health, individual variability, and sex. F.R.L.

A71-37492 **Man's response to the space environment.** Tony Nicholson (RAF, Institute of Aviation Medicine, Farnborough, Hants., England). *New Scientist and Science Journal*, vol. 51, July 29, 1971, p. 248-250.

It is pointed out that prolonged weightlessness and the difficulties of extravehicular work are the major issues of manned space flight. An understanding of these problems is essential not only for the exploration of the solar system beyond the moon but also for the full exploitation of orbiting laboratories. In many ways the capabilities of the Russian and American programs for manned missions have developed along separate lines. Cosmonauts have gathered highly significant data on living and working in the weightless state, while the astronauts have extensive experience of orbital extravehicular and lunar surface activity. G.R.

A71-37543 * **Adaptation to displaced vision - A change in the central control of sensorimotor coordination.** Martha E. Hardt, Richard Held, and Martin J. Steinbach (MIT, Cambridge, Mass.). *Journal of Experimental Psychology*, vol. 89, Aug. 1971, p. 229-239. 24 refs. NIH Grant No. MH-07642; Grant No. NGR-22-009-308.

In characterizing the changes that occur in sensorimotor coordination after viewing the prism-displaced image of the hand, four types of explanation can be advanced: visual, proprioceptive, motor, and sensorimotor. Each one predicts different consequences on different tests of coordination: reaching for visual targets, orienting head to hand, orienting eye to hand, and repositioning the hand in a learned posture. The results of four experiments using these tests are consistent only with the sensorimotor explanation. They imply a change in the control and assessment of coincidence between the direction indicated by the exposed arm and that of either a sensed external object or other body part. M.M.

A71-37544 **Visual-motor control loop - A linear system.** D. Adrian Wilkinson (York University, Toronto, Canada). *Journal of Experimental Psychology*, vol. 89, Aug. 1971, p. 250-257. 18 refs.

A model of prism adaptation is proposed suggesting that the visual-motor control loop is a linear system comprising a number of independent subsystems. Errors in the subsystems sum algebraically to produce the error of the total loop. This hypothesis was tested in two experiments. Exposure to visual-motor discordance produced by wedge prisms caused a change in the judged visual direction (V) of targets. Such exposure also produced a change in setting the hand to the median plane of the head (H). The prism-induced change in target-aiming performance (T) was equal to $(H + V)$. Viewing a visual display through the prisms produced changes in V and H, but the data did not fit the linear model $(H + V = T)$. Changes in pointing at visual targets with the untrained arm are fully accounted for by changes in V. M.M.

A71-37545 **Tracking errors amended without visual feedback.** Ronald W. Angel, Harry Garland (Stanford University, Stanford, Calif.), and Martin Fischler (Lockheed Missiles and Space Co., Palo Alto, Calif.). *Journal of Experimental Psychology*, vol. 89, Aug. 1971, p. 422-424. 5 refs.

Five Ss performed a pursuit tracking task in which the visual feedback was reversed on alternate blocks of target steps. The center of the visual display was screened so that Ss could not see the response marker during the initial part of each response. Numerous false moves were corrected at times when the response marker was invisible. The results confirm previous suggestions that errors can be amended by a central mechanism which does not require sensory feedback. (Author)

A71-37550 **Diastolic heart sounds and filling waves in coronary artery disease.** Peter F. Cohn, Pantel S. Vokonas, Richard A. Williams, Michael V. Herman (Peter Bent Brigham Hospital, Boston, Mass.), and Richard Gorlin (Howard Hughes Medical Institute). *Circulation*, vol. 44, Aug. 1971, p. 196-202. 23 refs. Research supported by the Women's Aid for Heart Research and the Heart Research Foundation; PHS Grants No. PO-1-HE-11306; No. IT 1 HE-5679.

One hundred thirty selected patients with chest pain syndromes were studied by apex- and phonocardiography as well as by cardiac catheterization; selective cine coronary arteriography, and cine left ventriculography. Ninety-three patients had coronary artery disease; 37 did not. Abnormal graphic studies were found in 42 patients with coronary artery disease and three patients with normal coronary arteriograms. These abnormalities correlated well with the presence of elevated left ventricular end-diastolic pressure. Third heart sounds were found less frequently than fourth heart sounds and/or abnormal apexcardiographic a waves, but when present were usually associated with a depressed cardiac index. Diagnostically, over 90% of all patients with chest pain who exhibited graphic abnormalities had significant coronary atherosclerosis. Normal graphic studies did not rule out coronary artery disease, but did indicate adequate left ventricular function since only 5% of patients with normal graphic studies had elevated left ventricular end-diastolic pressure combined with a low cardiac index. (Author)

A71-37569 # **Stop test method for the study of movement control processes (Metodika proby s ostanovkoi v izuchenii protsessov upravleniia dvizheniemi).** G. N. Zhukova, L. A. Tenenbaum, and E. I. Shafranova. *Avtomatika i Telemekhanika*, June 1971, p. 84-91. In Russian.

A stop test method is proposed for studying the role of acceleration in movement control processes in man. Results are presented of experimental studies, based on the proposed method, of periodic and individual elbow joint movements in healthy subjects, as well as of pathologic tremors in subjects afflicted by Parkinson's disease. The investigation possibilities held forth by the proposed method are discussed in the light of these results. M.V.E.

A71-37575 * **An index for describing food utility.** H. B. Chermiside, J. Y. Graudenz, A. Furst, and J. Shapira (San Francisco, University, San Francisco; NASA, Ames Research Center, Biotechnology Branch, Moffett Field, Calif.). *Western Pharmacology Society, Proceedings*, vol. 14, 1971, p. 121-124. Grant No. NGR-05-029-005.

Food utility calculations for various formose sugar treatments are presented. The food utility calculation is found to be a valid qualitative measure of the relative effects of dietary materials. Two measures are provided. Food utility is a general, rather than a precise, quantitative notion. Thus the indices of food utility must be used as descriptive, ordinal values, although experience indicates that they are quasi-quantitative. G.R.

A71-37646 * **Relative frequency distribution of D sub 125 C values for spore isolates from the Mariner-Mars 1969 spacecraft.** W. W. Bond, M. S. Favero, N. J. Petersen, and J. H. Marshall (Center for Disease Control, Phoenix, Ariz.). *Applied Microbiology*, vol. 21, May 1971, p. 832-836. 11 refs. NASA-supported research.

Study of bacterial spore crops prepared from 103 randomly selected aerobic mesophilic isolates collected during a spore assay of Mariner-Mars 1969 spacecraft conducted by the Jet Propulsion Laboratory. D sub 125 C values, which were determined by the fractional-replicate-unit-negative-most-probable number assay method using a forced air oven, ranged from less than 5 min to a maximum of 58 min. Subsequent identification of the 103 isolates indicated that there was no relationship between species and dry-heat resistance. A theoretical dry-heat survival curve of the population was nonlinear. The slope of this curve was determined almost exclusively by the more resistant organisms, although they represented only a small portion of the population. (Author)

A71-37648 * **Identification of human operator models by stochastic approximation.** C. B. Neal (Hughes Aircraft Co., Culver City, Calif.) and G. A. Bekey (Southern California, University, Los Angeles, Calif.). *Mathematical Biosciences*, vol. 10, 1971, p. 91-116. 27 refs. Grant No. NGR-05-018-022.

This article discusses the application of stochastic approximation to the estimation of human operator model parameters. Both continuous and sampled-data models are considered. Stochastic approximation was used successfully for parameter estimates in both types of models. In the case of sampled-data models, all parameters, including the sampling interval, have been estimated. (Author)

A71-37763 # **The physiological cost of flight work (O fiziologicheskoi stoimosti letnogo truda).** D. V. Mangina. *Voenno-Meditsinskii Zhurnal*, June 1971, p. 61-64. 13 refs. In Russian.

Survey of the literature on the effects of nervous-emotional stress on the physiology of pilots during flight. The link between nervous-emotional stress and premature fatigue, leading to cardiovascular disorders and psychic disturbances, is noted, as well as the prevalence of coronary atherosclerosis in pilots, which can lead to the sudden development of myocardial infarctions. The effect of long flights on disturbances of the circadian rhythms is also noted. Recommendations are made for counteracting these adverse effects by appropriate training and diet. A.B.K.

A71-37775 # **Typological features of human higher nervous activity and their significance in professional selection (Tipologichni osoblivosti vischoi nervovoi diial'nosti liudini ta ikh znachennia dlia profesiinogo dobori).** V. O. Troshikhin, S. I. Moldavs'ka, and N. V. Kol'chenko. *Akademiia Nauk Ukrain's'koi RSR, Visnik*, vol. 35, June 1971, p. 76-81. In Ukrainian.

Description of laboratory test equipment used to evaluate the agility of the central nervous system and the brain's ability to process information presented in the form of sustained concentrated stimuli. Auditory stimuli consisted of three tones of different frequencies, while visual stimuli involved a display of geometrical patterns and of words belonging to three different subject categories. The subject is required to perform simple manual tasks corresponding to different stimuli, and the latter are presented with increasing frequency. Satisfactory results were obtained with this procedure, used to select optimum radiotelegraphist candidates. T.M.

A71-37777 # **Investigation of a mathematical model of the cardiovascular system (Doslidzhennia matematichnoi modeli sertsevo-sudinnoi sistemi).** V. O. Lishehuk and B. L. Palets' (Akademiia Nauk Ukrain's'koi RSR, Institut Kibernetiki, Kiev, Ukrainian

SSR). *Avtomatika*, vol. 16, May-June 1971, p. 25-32. 17 refs. In Ukrainian.

Study of a mathematical model for the statics of a cardiovascular system. Analytical expressions and experimental data are given for evaluating the influence of different system parameters on important circulatory indices such as minute volume and arterial tension. It is shown that the interaction of biophysical and regulatory mechanisms is organized in such a way that controlled variations of circulatory parameters resulting in higher system productivity are accompanied by increased sensitivity of cardiac minute volume and arterial tension to these changes. In other words, the higher the organism's circulatory requirements, the better they are satisfied by the circulatory system. T.M.

A71-37900 * # **A fraction of the ventricular myocardium that has the specificity of the cardiac beta-adrenergic receptor (norepinephrine binding/displacement).** Robert J. Lefkowitz (Massachusetts General Hospital, Boston, Mass.) and Edgar Haber (Harvard University, Boston, Mass.). *National Academy of Sciences, Proceedings*, vol. 68, Aug. 1971, p. 1773-1777. 18 refs. NASA-supported research.

Description of the characteristics of binding of (H-3)norepinephrine to microsomal particles from the canine ventricular myocardium. The binding was found to be blocked by catecholamines in direct proportion to their beta-adrenergic potency on cardiac action. It is concluded that, on the basis of specificity and affinity of binding, the microsomal particles are likely to contain the beta-adrenergic receptor. Z.W.

A71-37917 * # **Planetary quarantine considerations for outer planet missions.** William Stavro and Charles Gonzalez (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *American Astronautical Society, Annual Meeting, 17th, Seattle, Wash., June 28-30, 1971, Paper AAS 71-122*. 23 p. 6 refs.

The results of an initial investigation of the effect of a planetary quarantine constraint on a typical multiple outer planet mission are presented. The general characteristics of outer planet missions affecting planetary quarantine are presented first. A sample mission is then selected (Jupiter-Saturn-Pluto) and its characteristics given. Navigation error sources are described and a possible midcourse maneuver plan is presented. A branch diagram showing sub-allocations of the planetary quarantine constraint among the various sources is then constructed. An analysis to determine the probability that the spacecraft impacts an encounter planet due to navigation uncertainties is then performed and applied to the selected mission. Conclusions are drawn indicating the implications of planetary quarantine constraints on outer planet missions. (Author)

A71-38016 # **Ergonomics in aviation (Ergonomia w lotnictwie).** Zbigniew Jethon. *Technika Lotnicza i Astronautyczna*, vol. 26, July 1971, p. 15-18. In Polish.

Ergonomic evaluation of the working conditions of aircraft crewmembers is discussed from the viewpoint of static and dynamic adaptation of aircraft system designs to human psychophysical capabilities. Significant criteria for functional evaluation of human-operator and machine elements interfaced in a common system are defined, and an ergonomic approach to system design is outlined in consecutive stages of initial research, prototype development, production, training, utilization, and final modification. T.M.

A71-38048 **Biological effects of radiation.** J. E. Coggle (St. Bartholomew Hospital, London, England). London, Wykeham Publications (London), Ltd. (Wykeham Science Series, No. 14), 1971. 157 p. \$4.80.

A précis of some of the scientific, medical, agricultural,

industrial, and military uses of radiation stresses the need to have an accurate evaluation of the biological risks involved in its use due to the widespread and increasing use of radiation in modern society. The topics include some properties of ionizing radiation, the effect of radiation at the molecular and subcellular levels, cellular effects of radiation, radiation cell survival in vivo, the effect of radiation at the tissue level, the genetic effects of ionizing radiation, some factors which modify the biological effect of radiation, radiation and cancer, radiation lifeshortening, and radiation hazards and the standards for radiation protection. M.M.

A71-38058 Positive and negative deflections in the off response of the electroretinogram in man. Kazuo Kawasaki (Kanazawa University, Kanazawa, Japan), Yutaka Tsuchida, and Jerry H. Jacobson (Cornell University, Medical College, New York, N.Y.). *American Journal of Ophthalmology*, vol. 72, Aug. 1971, p. 367-375. 22 refs. Research supported by the Samuel Bronfman Foundation; PHS Grant No. EY-00264.

When stimuli of relatively low intensity are used, the off response of the human electroretinogram (ERG) consists mostly of a negative-going wave. With intense stimuli, the off response begins with a positive-going wave. The negative-going wave of the off response to dim stimulus is absent in stationary congenital night blindness and present in rod monochromatopsia. The positive-going wave of the off response to intense stimulus is present in stationary congenital night blindness and absent in rod monochromatopsia.

M.M.

A71-38059 Effects of image blur and lateral inhibition in the visual system on visual performance. J. C. Trinder (New South Wales, University, Sydney, Australia). *Optica Acta*, vol. 18, June 1971, p. 461-477. 23 refs.

Accuracies obtained for the visual task of pointing or centering a circular black measuring mark on a circular bright target are presented. To understand the complex pattern of pointing accuracies, the shape of the image actually seen by the visual system is computed. This is performed by convolving the luminance profiles of the targets with point spread functions of the visual system, which estimate effects of image blur and lateral inhibition. The resulting luminance profiles are then analyzed and simple visual criteria on which the pointing task is based are derived. (Author)

A71-38061 A psychometric study of the annoyance caused by noise (Eine psychometrische Untersuchung der Lästigkeit von Geräuschen). V. W. Rähfs and A. Schaaf. *Acustica*, vol. 24, June 1971, p. 340-346. 19 refs. In German.

Determination of the annoyance values of laboratory-generated complex sound stimuli by a pure psychological scaling method, and correlation of these values with the corresponding physical parameters by means of a multiple regression technique. The sound stimuli employed consisted of wideband noise with a superimposed narrow-band component, the location and intensity of which were systematically varied. On the basis of these calculations psychophysical relations are obtained which can be expressed by a simple equation.

A.B.K.

A71-38062 Middle ear function - A kinematic analysis. V. Marples (Warwick, University, Coventry, England). *Acustica*, vol. 24, June 1971, p. 347-353. 17 refs.

Description of the first stage of an approach to the simulation of the mode of transmission of energy through the middle ear. The middle ear mechanism is subjected to topological analysis and an investigation of the number of its degrees of freedom. These are interpreted in the light of current knowledge of the mode of

operation. On the basis of this analysis a number of alternative suggestions are made regarding details of the modes of motion of the ossicles. The importance of a detailed dimensional geometrical model of the middle ear for further work is emphasized. A.B.K.

A71-38071 The maturation of the circadian rhythm of brain norepinephrine and serotonin in the rat. Yutaka Asano (Hokkaido University, Sapporo, Japan). *Life Sciences, Part I - Physiology and Pharmacology*, vol. 10, Aug. 1, 1971, p. 883-894. 13 refs.

Changes in the daily variations of norepinephrine and serotonin contents in the rat brain were examined for the period ranging from 8-9 to 56-66 postnatal days. Both amines showed a common, presumably inborn pattern of circadian changes up to day 15-17, exhibiting a peak in the dark and a reduction in the light periods. From day 35-37 on, new and mature forms of circadian rhythm were observed; norepinephrine demonstrated a peak in the dark and serotonin a peak in the light phases. It was confirmed also that a circadian rhythm of spontaneous motor activity, and accordingly of the sleep-and-wakefulness pattern is formed gradually about 3 weeks after birth. A hypothesis was suggested that the maturation of circadian rhythm of brain norepinephrine and serotonin contents is closely related with that of spontaneous activity and the sleep-and-wakefulness mechanism. (Author)

A71-38197 # Microelectrode studies of convergence of signals of various sensory modalities on brain neurons (Mikroelektroddnye issledovaniia konvergentnoi signalov raznykh sensornykh modal'nostei na neuronakh golovnogo mozga). L. L. Voronin, V. G. Skrebitskii, and I. N. Sharonova (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Uspekhi Fiziologicheskikh Nauk*, vol. 2, Jan.-Mar. 1971, p. 116-143. 227 refs. In Russian.

Systematization of the reactions to stimuli of various sensory modalities, noting the main types of convergence most characteristic of the major portion of the brain neurons of mammals. Three types of convergence of signals of various sensory modalities are noted as a function of the nature of the impulse reactions of individual brain neurons in mammals. The first type of convergence is most characteristic of 'associative' structures, while the second type is characteristic of primary analyzer systems, and the third type is characteristic of a number of 'nonspecific' structures. However, in almost any formation it is possible to encounter neurons with different types of convergence. The types of convergence may vary as a function of the functional state and previous activity of the brain. A detailed analysis is made of the available data obtained from studies of convergence and the interaction of various signals by means of intracellular recording. A.B.K.

A71-38198 # Correlation analysis of the electrical activity of human respiratory muscles (Korrelatsionnyi analiz elektricheskoi aktivnosti dykhatel'nykh myshts cheloveka). L. E. Sapuntsov (Akademii Meditsinskikh Nauk SSSR, Moscow, USSR). *Biulleten' Eksperimental'noi Biologii i Meditsiny*, vol. 71, June 1971, p. 9-12. In Russian.

Correlation analysis of interferential electromyograms recorded from external intercostal muscles in healthy young human subjects during (1) regular breathing, (2) breathing of an air mixture with 5 to 6% carbon dioxide, (3) freely intense breathing, and (4) breathing with an inlet restriction. When recordings were made from the sixth and eighth intercostal spaces on one (right) side of the chest, the mean value of the cross-correlation coefficient was 0.46 for normal breathing and 0.54 for the stressed breathing tests. When recordings were taken from the eighth intercostal spaces of both sides of the chest, these values were 0.21 and 0.33, respectively. T.M.

A71-38199 * **Simulation of passive thermal behavior of a cooling biological system - Entry into hibernation.** R. H. Luecke, E. W. Gray, and F. E. South (Missouri, University, Columbia, Mo.). *Pflügers Archiv*, vol. 327, no. 1, 1971, p. 37-52. 21 refs. Grant No. NGR-26-004-025.

A mathematical model is developed which describes the dynamic generation and transfer of heat in the marmot at normothermic to hibernating body temperatures. Since the animal approximates a ball as it enters hibernation, the form of the model was a sphere divided into three concentric layers: central core, muscle, and skin. Each layer was assumed homogeneous in composition, but distributed with respect to temperatures. The nonlinear partial differential equations describing heat exchange between layers were solved numerically on a computer. The temperatures computed from the model were compared with experimental temperatures of marmots entering hibernation. The agreement between model and experimental temperatures was fair. To help improve the model, the principal parameters were varied to determine sensitivities. M.V.E.

A71-38200 **Alveolar-arterial O₂-pressure difference during hyperventilation (Die alveolär-arterielle O₂-Druckdifferenz bei Hyperventilation).** J. P. Pichotka, H. Krekeler, J. Schotte, and K. Muysers (Bonn, Universität, Bonn, West Germany). *Pflügers Archiv*, vol. 327, no. 1, 1971, p. 53-67. 18 refs. In German.

The alveolar-arterial O₂-pressure difference (AaDO₂) was investigated during controlled hyperventilation and during the subsequent posthyperventilatory phase. Alveolar gas pressures were measured by mass spectrometry, and arterial partial oxygen pressures by polarography. The AaDO₂ increased with decreasing alveolar partial CO₂ pressure (PACO₂) during hyperventilation. During the posthyperventilatory period, the AaDO₂ remained elevated, although alveolar and arterial partial O₂ pressures were often distinctly below normal. Plotted against PACO₂, AaDO₂ values obeyed a linear function throughout hyperventilation and the posthyperventilatory phase. It is concluded that, under the given experimental conditions, AaDO₂ is mainly determined by PACO₂. M.V.E.

A71-38222 # **The question of an impairment of hearing due to occupational causes for cockpit crews in civil aviation (Zur Frage der berufsbedingten Hörschädigung der Cockpitbesatzungen in der zivilen Luftfahrt).** Jürgen Kressin and Rolf Karbaum. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 7, 1971, p. 322-325, 340. 16 refs. In German.

An investigation involving 123 members of cockpit crews in the age between 40 and 50 years was conducted in order to determine the effect of the noise in the cockpit of an aircraft on the hearing facilities of persons who are exposed to this noise. The characteristics and the causes of the cockpit noise are discussed. The subjects had undergone an audiometric examination once a year. Three successive audiograms were evaluated for each ear of every person. An impairment of the auditory facilities was found, amounting to 35 dB at a frequency of 6000 Hz for 75% of the subjects, and to values between 35 and 60 dB for 20%. For the remaining 5% the hearing loss was greater than 60 dB. G.R.

A71-38223 # **Applied electroencephalography in aviation medicine as functional diagnosis of central regulations (Angewandte Elektroencephalographie in der Luftfahrtmedizin als Funktionsdiagnostik zentraler Regulationen).** Evelyn Schulze. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 7, 1971, p. 326-330. 5 refs. In German.

The various stresses to which members of the flying personnel are subjected are examined, and the reactions of the organism in response to these stresses are analyzed. The objectives of a diagnosis conducted with the aid of electroencephalography are obtained on

the basis of this analysis. Problems regarding the evaluation of the EEG are discussed. The determination of a number of disturbances of the brain functions with the aid of the EEG requires tests regarding the effect of stresses. The use of the EEG in connection with the problem of fatigue and the allocation of necessary rest periods is also considered. G.R.

A71-38224 # **The growing importance of a psychological basic training for stewardesses (Die wachsende Bedeutung einer psychologischen Grundausbildung im Stewardessenberuf).** Ingo Sedding. *Technisch-ökonomische Informationen der zivilen Luftfahrt*, vol. 7, no. 7, 1971, p. 331-335. In German.

The educational requirements for stewardesses are considered, and the various functions of a stewardess in an aircraft are examined. The importance of a psychological training for the development of the personality of a stewardess is pointed out. A 20-hour course in the field of psychology was introduced into the basic training of stewardesses in the German Democratic Republic in 1967. The course was considerably extended in 1969. The objectives of the course are to call the attention of the stewardess to the problems of her own personality on a psychological basis, and to enable her to establish consciously her relation with the passenger. G.R.

A71-38276 **On modelling neural networks in the retina.** C. Tate and M. M. Woolfson (York, University, York, England). *Vision Research*, vol. 11, July 1971, p. 617-633. 18 refs. Research supported by the Science Research Council and the Wellcome Trust.

Signal propagation in a network of model neurons is formulated in terms of a system of differential equations which combine cable theory with a model for synaptic transmission. Excitatory and inhibitory synapses are formally identical, and their character is specified by giving numerical values to the postsynaptic equilibrium potentials. The retina's five major cell types are represented in a planar model; the equations are integrated by a digital computer program whose input specifies network and stimulus parameters. The connection scheme provides for lateral inhibition, and some calculated ganglion cell responses are similar to recordings from 'on-center' and 'off-center' units in the vertebrate retina. These results are produced by special modes of connection at the level of the model which corresponds to the inner plexiform layer and they may not be realistic. Nevertheless, the calculations performed so far illustrate some of the ways in which the model's parameters govern its behavior. M.M.

A71-38277 **Patterns of spatial integration in the detection of compound visual stimuli.** Frank M. Bagrash, Larry G. Kerr, and James P. Thomas (California, University, Los Angeles, Calif.). *Vision Research*, vol. 11, July 1971, p. 635-645. 12 refs. PHS Grants No. NB-07249; No. EY-00360.

Increment thresholds were measured for foveally viewed square and circular stimuli varying in area from 400 to 1600 sq min of visual angle. They were presented singly or in pairs, one stimulus component superimposed on the other. The single stimuli yielded a traditional areal summation curve. Thresholds for the compound stimuli were lower. The contribution of the small component to the visibility of a compound stimulus depended on the overall area of the compound. These results suggest that more than one pattern of spatial integration is available. The results are discussed in terms of the meaning of the areal summation function and the existence of size-tuned detector mechanisms in the human visual system. M.M.

A71-38278 **Evidence of role of size-tuned mechanisms in increment threshold task.** James P. Thomas and Larry G. Kerr

(California, University, Los Angeles, Calif.). *Vision Research*, vol. 11, July 1971, p. 647-655. 13 refs. PHS Grants No. NB-07249; No. EY-00360.

Detectability of a foveal stimulus against a 248-troland background was measured. The retinal illuminance of the stimulus was not uniform, but was varied systematically from one part of the stimulus to another. Over limited ranges, adding light to part of the stimulus reduces the visibility of the stimulus as a whole. Presenting an adapting stimulus also reduces visibility. The reduction is greatest when the relative distribution of light in the adapting stimulus matches the distribution in the test stimulus. Both observations support the hypothesis that mechanisms which mediate detection are size-tuned.

M.M.

A71-38279 Comparison of human visual cortical potentials evoked by stabilized and unstabilized targets. Ulker Tulunay Keesey (Wisconsin, University, Madison, Wis.). *Vision Research*, vol. 11, July 1971, p. 657-670. 15 refs. NIH Grant No. NB-06151.

Visual cortical potentials were evoked by a 2 deg sinusoidally modulated field. Under both the stabilized and unstabilized conditions, the VECF (visual evoked cortical potential) was composed of the fundamental and the harmonics of the stimulus frequency. The total RMS voltage of the potential was a function of flicker frequency and amplitude. When flicker below 20 Hz was used, image stabilization yielded the smaller VECF. There was, however, no subjective disappearance of the stimulus at these low flicker frequencies. Under either viewing condition the VECF amplitude varied randomly as a function of time and did not correlate with changes in either the total EEG level or the alpha frequency of the EEG.

M.M.

A71-38280 The influence of spatial intervals and thickness of lines of stimulus patterns on stabilized images. B. Cardu, M. Gilbert, and M. Strobel (Montréal, Université, Montreal, Canada). *Vision Research*, vol. 11, July 1971, p. 671-677. 10 refs. National Research Council of Canada Grant No. APA 271.

The influence of lateral inhibition on stabilized images was studied by presenting to three subjects concentric triangles and systematically varying the visual angle subtended, the interval between lines and the thickness of the line. When the images were stabilized on the retina, subjects reported the disappearance of the image in various ways. In particular, the number of times fusion of lines before disappearance was reported was found to be inversely related to the size of the interval and directly related to the thickness of the lines. These findings were consistent with quantitative estimates of lateral inhibition.

M.M.

A71-38281 * Independence of evoked potentials and apparent size. D. Regan (Keele, University, Keele, Staffs., England) and W. Richards (MIT, Cambridge, Mass.). *Vision Research*, vol. 11, July 1971, p. 679-684. 12 refs. Research supported by the Medical Research Council, the Hartford Foundation, NIH, and NASA.

Experimental investigation of the possibility that visual evoked potential (EP) might also be altered when the subject changed the angle of convergence of his eyes. When the eyes converge, there is a large reduction in the apparent size of an invariant retinal image. If the magnitude of the EP is correlated with apparent, rather than retinal image size, then convergence should also lead to a change in the relation between EP amplitude and the check size of an oscillating checkerboard stimulus. No definitive change in the EP measure was found, suggesting that the neural constraints upon the EP are more peripheral than the site of size scaling.

M.M.

A71-38282 Visually evoked cortical responses to the on- and off-set of patterned light in humans. M. Russell Harter (North Carolina, University, Greensboro, N.C.). *Vision Research*, vol. 11, July 1971, p. 685-695. 32 refs. NSF Grant No. GB-8053.

Averaged evoked cortical potentials were investigated as a function of the on- and off-set of patterned light and the density and sharpness of contours. Six adult human subjects viewed patterned stimuli which were illuminated every 1.3 sec for 600 msec. Contour density and sharpness were varied by varying the size and distance between polka-dots and induced refractive error. Analyses of variance indicated that dot-size and between-dot-distance significantly influenced the amplitude of early and late components of evoked responses to both the on- and off-set of pattern. In general, response amplitude progressively decreased as a function of decreased distance between elements and increased refractive error. The results are discussed in terms of lateral inhibition and size of receptive field centers of on- and off-center cells in the visual system of animals.

M.M.

A71-38283 Hue shifts produced by intermittent stimulation. Thomy H. Nilsson and Thomas M. Nelson (Alberta, University, Edmonton, Alberta, Canada). *Vision Research*, vol. 11, July 1971, p. 697-712. 15 refs. National Research Council of Canada Grant No. APA 145.

A matching technique was used to measure the shifts in hue produced in ten narrow-band spectra between 425 and 650 nm by eight rates of intermittency ranging from 0 to 15 Hz. The direction of hue shift did not vary with intermittency rate, but magnitude of hue shift did. The intermittency rate producing maximum shift varied with wavelength. Stimuli at 425, 500 and 574-600 nm were relatively invariant at all rates. Maximal hue shifts were observed with stimuli at 525-550 and 650 nm toward longer wavelengths. Direction of shift of red targets may, however, depend on observer criteria, since strong desaturation effects accompanied the hue shifts. The data indicate that the hue shifts produced by intermittent stimulation differ from those produced by luminance changes. It is suggested that intermittency hue shifts involve an interaction between stimulus intermittency and a temporal coding of color in the visual system.

M.M.

A71-38284 Evaluation of retinal thresholds for C.W. laser radiation. Irving L. Dunskey and Paul W. Lappin (USAF, School of Aerospace Medicine, Brooks AFB, Tex.). *Vision Research*, vol. 11, July 1971, p. 733-738. 8 refs.

Rhesus monkeys were exposed to ocular radiation from the yellow line, 568.2 nm emitted by a krypton CW gas laser to determine the minimal ophthalmoscopic visible damage threshold on the retina. The effective-dose 50%-probability points were determined for the extramacular sites having an exposure time range of 16-500 msec. Observations of the fundi were made prior to, during, and after each exposure, using a fundus camera. Damage thresholds for krypton were examined and compared to the reported results of helium-neon, argon, and neodymium.

M.M.

A71-38285 Derivation of wavelength discrimination from colour-naming data. Damien P. Smith (Melbourne, University, Melbourne, Australia). *Vision Research*, vol. 11, July 1971, p. 739-742. 10 refs.

Description of an experiment of wavelength discrimination from color naming, using the Index of Nameable Color Difference (INCD). Ten young adults with normal visual acuity and color vision acted as subjects. Despite the differences in experimental conditions, the name data compare well with those of Boynton and Gordon (1965), the individual name curves agreeing in spectral location and

distribution. It thus appears, as Jacobs and Gaylord (1967) suggested, that color-naming may be employed to formulate a measure of discrimination that qualitatively parallels the differential threshold curve determined by conventional wavelength discrimination techniques. M.M.

A71-38286 * Extraretinal correction and memory for target position. Alexander A. Skavenski (Maryland, University, College Park, Md.). *Vision Research*, vol. 11, July 1971, p. 743-746. PHS Grant No. EY-00325; Grant No. NSG-398.

Description of an experiment showing that error (the distance of the line of regard from the prior target position) stabilizes at about 3.5 deg of arc over very long periods of time. A correlational analysis of prior data shows that many eye movements in the dark tend to be corrective. The findings confirm that there is a good extraretinal source of eye position information and show that such information can be stored in memory and used to control eye position when visible targets are not available. M.M.

A71-38296 Relations between pressure in pulmonary artery, left atrium, and left ventricle with special reference to events at end diastole. S. Å. Forsberg (Sahlgren's Hospital, Göteborg, Sweden). *British Heart Journal*, vol. 33, July 1971, p. 494-499. 12 refs.

Results were extracted from 158 patients who underwent diagnostic heart catheterization at rest. Seventeen were considered normal. Simultaneous pressure records from the pulmonary artery and left atrium were always made and often also from the left atrium and ventricle. Some of the main conclusions are as follows: (1) normally at rest there is left atrioventricular diastolic pressure congruence; (2) normally the pulmonary arterial diastolic pressure is approximately identical with the end-diastolic pressure of the left ventricle; (3) at the end of diastole, the flow and pressure gradient across the pulmonary vascular bed seem to be in phase and both are close to zero; and (4) patients with different cardiovascular diseases, the majority with mitral valvular disease, were compared with the normal group. With moderate mitral stenosis without much increased pulmonary vascular resistance, the relation between pulmonary arterial diastolic pressure and end-diastolic pressure in the left atrium is similar to that in normal patients. M.M.

A71-38442 Why the double standard - A critical review of Russian work on the hazards of microwave radiation. Leo P. Inglis (North American Rockwell Corp., Atomics International Div., Canoga Park, Calif.). In: The expanding science of EMC; Institute of Electrical and Electronics Engineers, International Symposium on Electromagnetic Compatibility, Anaheim, Calif., July 14-16, 1970, Symposium Record. New York, Institute of Electrical and Electronics Engineers, Inc., 1970, p. 168-172. 8 refs.

Continued interest in the determination of appropriate national levels of exposure to microwave fields has directed attention to Soviet work in this field. The vastly different standards adopted in the two countries have aroused much speculation as to the reasons. In this paper the Russian work is reviewed, and the major individuals identified. An explanation for the different exposure limits is offered, based partly on the difference in national organization.

(Author)

A71-38544 # Isolation and identification of physiologically active substances of indole nature in extracellular metabolites of *Chlorella* (Vydelenie i identifikatsiya fiziologicheskii aktivnykh veshchestv indol'noi prirody vo vnekletochnykh metabolitakh *Khlorelly*). M. I. Tauts and V. E. Semenenko (Akademiia Nauk

SSSR, Institut Fiziologii Rastenii, Moscow, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 198, June 1, 1971, p. 970-973. 11 refs. In Russian.

Chromatographic analysis of the role of physiologically active substances in stimulating growth and cell division in a *Chlorella* sp. K culture. An attempt is made to isolate the growth-stimulating substances from the culture medium and to test their activity on coleoptiles and on the algae producing these substances, and also to determine by physicochemical methods the group of compounds to which these substances belong. It is shown that indolyl-3-acetic acid is present in extracellular metabolites of a bacterially pure *Chlorella* culture. Moreover, a certain biologically active substance, which is believed to be of indole nature, is also detected in these metabolites.

A.B.K.

A71-38545 # Total content of protein and the quantity of basic proteins in the neurons and neuroglia of the supraoptical and red brain nuclei of rats during natural sleep and when deprived of the paradoxical phase of sleep (Obshchee sodержanie belka i kolichestvo osnovnykh belkov v neironakh i neiroglii supraopticheskogo i krasnogo iader golovnogo mozga krys pri estestvennom sne i lishenii paradoksal'noi fazy sna). G. Sh. Voronka, N. N. Demin, and L. Z. Pevzner (Akademiia Nauk SSSR, Institut Fiziologii, Leningrad, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 198, June 1, 1971, p. 974-977. 19 refs. In Russian.

Study of the changes in the protein content in the cytoplasm in certain neurons and glial satellite cells in the supraoptical and red nuclei in the brains of white rats during natural sleep and during periods of deprivation of the paradoxical phase of sleep. It is found that natural sleep leads to an accumulation of total protein and especially of basic proteins in the neuroglial cells of the supraoptical nucleus and to an accumulation of basic proteins in the neurons of this nucleus without changes in their total protein content. In the red nucleus, on the other hand, the total protein content decreases somewhat both in the neuroglia and especially in the neurons, while the quantity of basic proteins slightly increases in the glial cells and remains practically unchanged in the neurons. In the supraoptical nucleus lack of sleep for 24 hours leads to a sharp decrease in the total protein content in the neurons, followed by a certain increase. The total protein content in the neuroglia decreases, but less intensely and more uniformly. The quantity of basic proteins decreases only in the neurons of this nucleus; in the glial cells there is no change. In the red nucleus deprivation of the paradoxical phase of sleep also causes a sharp decrease in the total protein content. However, in the neurons of this nucleus it is less pronounced than in the supraoptical nucleus and is not followed by an increase, while in the glial cells it is more pronounced than in the supraoptical nucleus. In the red cell under these conditions the quantity of basic proteins decreases both in the neurons and in the neuroglia, although somewhat less in the latter.

A.B.K.

A71-38551 Renin, norepinephrine, and epinephrine responses to graded exercise. Theodore A. Kotchen, Loren H. Hartley, Thomas W. Rice, Edward H. Mougey, LeeRoy G. Jones, and John W. Mason (U.S. Army, Walter Reed Army Institute of Research, Washington, D.C.; U.S. Army, Research Institute of Environmental Medicine, Natick, Mass.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 178-184. 32 refs.

Measurement of plasma renin activity and plasma norepinephrine and epinephrine during graded exercise. Six healthy subjects exercised on a bicycle ergometer at three different 10-min work loads, selected to represent light, heavy, and maximum exercise, and calculated to result in 40, 70, and 100% maximum oxygen consumption, respectively. Renin activity became significantly elevated after exercise at 70% and 100% maximum oxygen consumption but not after 40% maximum oxygen consumption. Ten minutes after exercise at 70% maximum oxygen consumption, renin activity was normal. The renin response to exercise at 100%

maximum oxygen consumption was more sustained, although normal by 30 min after exercise. Significant elevations from resting norepinephrine also occurred after exercise at 70% and 100% maximum oxygen consumption. The changes in epinephrine were comparatively small, and epinephrine was significantly elevated only after maximum exercise. The similar catecholamine and renin responses to graded exercise suggest that acutely elevated renin activity may be related to enhanced sympathetic nervous system activity. (Author)

A71-38552 * Disclosure by dietary modification of an exercise-induced protein catabolism in man. Paul A. Molé and Robert E. Johnson (Illinois, University, Urbana, Ill.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 185-190. 49 refs. Grant No. NGR-14-005-050.

Three men were sequentially fed diets providing their normal caloric requirements (NCR), NCR plus 500, and NCR plus 1,000 kcal, and a constant protein intake of 2 g/kg body weight. Exercise requiring 500 kcal/session was taken on days 6 and 7 of each dietary regimen. The subjects' body weights were constant and they were in positive nitrogen (N) and sulfur (S) balances during the preexercise period on the NCR diet. Exercise produced a 500-kcal deficit but had no effect on urinary N and S excretions during NCR feeding. Surfeit calorie feeding decreased the preexercise urinary N (urea) and S (inorganic sulfate) excretions below the NCR resting levels, thereby making the N and S balances more positive. In contrast to the NCR dietary period, exercise during surfeit feeding significantly increased the urinary N (urea) and S (inorganic sulfate) outputs above their corresponding preexercise levels. These findings indicate that the exercise-induced protein catabolism was not due to a caloric deficit since the catabolic effect of exercise occurred only in the hypercaloric state. (Author)

A71-38553 Determination of maximal oxygen uptake with unsteady-state measurements. J. Howland Auchincloss, Jr., Robert Gilbert, Richard P. Bowman, and Gerhard H. Baule (New York, State University; Syracuse University, Syracuse, N.Y.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 191-197. 12 refs. PHS Grant No. H-2800.

Measurement of maximum oxygen uptake by two techniques in 13 normal subjects, four patients with valvular heart disease, and one with pulmonary disease. A conventional circuit for timed collection of expired air (GCC) was compared with a new circuit (AC) in which inspired ventilation and mixed expired gas concentration were continuously recorded. Treadmill walking speeds were constant during both tests for any individual while grades varied by 2.5% increments. In GCC test collections were made between 1.5 and 2.5 min, while in AC experiments the oxygen uptake was calculated every 0.5 min from onset of the test to its termination at 2.5 min. AC tests could yield the breaking point (BP) oxygen uptake if the subject was forced to stop after 1 min but before 2.5 min. Maximum oxygen uptake for GCC experiments (average of two highest runs) and AC experiments (average of a BP value and the 2-min value of the highest completed test) showed mean values differing by 2.9%, the difference was not statistically significant. Therefore with AC it was possible to determine maximum oxygen uptake in 2-min tests. (Author)

A71-38554 Diet, muscle glycogen, and endurance performance. Jan Karlsson and Bengt Saltin (Gymnastik-och Idrottshögskolan, Stockholm, Sweden). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 203-206. 14 refs. Research supported by the Swedish Medical Research Council and the Swedish Sports Federation.

The influence of high muscle glycogen content on the performance of prolonged heavy exercise was evaluated. Ten subjects

of the same race (30 km) twice, 3 weeks apart. Six subjects performed race I after maintaining a special regimen including a carbohydrate enriched diet. The other four subjects maintained a mixed diet prior to race I. Before race II the subjects reversed the procedure. After the special regimen, mean muscle glycogen content in the lateral portion of the quadriceps muscle was 35 g/kg and after the mixed diet the corresponding value was 17 g/kg wet muscle. The best performance (shortest work time) was attained in all subjects when they had followed the special regimen. However, there was nothing to indicate that a high initial muscle glycogen content made it possible to run faster at the beginning of the race. Mean glycogen usage in the quadriceps muscle was calculated to amount to approximately 0.5 g/(kg wet muscle x km), and an optimal pace could not be maintained with a 3-5 g/kg muscle glycogen content in the thigh. (Author)

A71-38555 * In vivo and in vitro determinations of body fat and body water in the hamster. A. M. Kodama (California, University, Berkeley, Calif.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 218-222. 18 refs. Grant No. NGL-05-003-024.

In vivo measurement of total body water and body density on 34 hamsters (*Mesocricetus auratus*) by the dilution method using super 3 H₂O and an air-displacement technique for estimating body volume. The animals were subsequently sacrificed and body composition determined by direct chemical analyses. When body fat content computed from (1) body density, (2) per cent body water by super 3 H₂O dilution, and (3) body density and per cent body water by super 3 H₂O dilution, was compared with that found by direct analyses, correlation coefficients of 0.94 to 0.97 and standard errors of estimate of 1.0 to 1.7% of body weight were obtained. A predicting equation based on both body density and per cent body water yielded values of per cent body fat which were in somewhat better agreement with the actual fat content, than when body density or per cent body water alone were used. In vitro body composition measurements showed a correlation coefficient of 0.98 between per cent body fat determined by petroleum ether extraction and per cent body water obtained by desiccation. The fraction of water in the fat-free body was remarkably constant, with a mean value of 73.3% and a coefficient of variation of less than 1%. The nitrogen, sodium, potassium, magnesium, and calcium content of the fat-free body were also relatively constant, with coefficients of variation ranging from 3 to 6%. (Author)

A71-38556 Diffusion component of alveolar-arterial oxygen pressure difference in man. Robert Cohen, Edward M. Overfield, and Johannes A. Kylstra (Duke University, Durham, N.C.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 223-226. 8 refs. NIH Grants No. HE-05604-8; No. HE-47222; No. HE-07896; No. HE-5662; Contract No. NR-101-758.

Determination of alveolar-arterial oxygen pressure differences, (A-a)DO₂, in seven healthy men at rest and during exercise at varied P_I sub O₂ and F_I sub O₂. The distribution component of (A-a)DO₂ was virtually eliminated by breathing 100% oxygen, and the shunt component was minimized by lowering the pressure in an altitude chamber in which the subjects were seated. At rest, during breathing of 13 to 14% oxygen, with a mean P_A sub O₂ of 59 mm Hg, the mean (A-a)DO₂ was 9 mm Hg (range 6 to 14 mm Hg). At rest, during breathing of 100% oxygen, with a mean P_A sub O₂ of 56 mm Hg, the mean (A-a)DO₂ was 0 mm Hg (range -4 to 3 mm Hg). During 100-W exercise with breathing of oxygen at a mean P_A sub O₂ of 56 mm Hg, the mean (A-a)DO₂ was 13 mm Hg (range 10 to 15 mm Hg). It is concluded that in healthy men breathing 13 to 14% oxygen there is, on the average, no measurable diffusion component of (A-a)DO₂ at rest; however, the diffusion component is present during exercise. (Author)

A71-38557 Regional cerebral blood flow, O₂, and EEG in exposures to O₂ at high pressure. John W. Bean, James Lignell, and John Coulson (Michigan, University, Ann Arbor, Mich.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 235-242. 41 refs. NIH Grant No. HE-01646.

Study of the interrelationship of regional changes in cerebral blood flow, tissue O₂, EEG, and behavioral reaction in unanesthetized rats breathing air, O₂ at atmospheric and 65 to 80 psig by simultaneous recordings from multiple thermoflow probes, polarographic O₂, and EEG electrodes. These showed synchronous cyclical regional flow changes correlated with tissue O₂ and EEG activity but unrelated to cardiac or respiratory cycles, regional reciprocal flow changes not closely correlated with EEG activity until after prolonged exposure to O₂ at high pressure (OHP), when preconvulsive EEG changes appeared, which developed into massive EEG discharge associated with a shift in regional flow pattern, a pronounced regional flow and tissue O₂ partial pressure increase, and precipitation of overt convulsion. These changes are interpreted as due in part to regional O₂ vascular control involving a primary vasoconstriction and a secondary dilation due to an eventual loss or breakdown of O₂ constrictive control with a resultant sharp increase in regional blood flow and tissue O₂ partial pressure - a sequence of events which would, then, constitute an important aspect of the toxic action of OHP on the central nervous system. (Author)

A71-38558 Ozone tolerance studies utilizing unilateral lung exposure. Stephen M. Alpert and Trent R. Lewis (U.S. Public Health Service, National Air Pollution Control Administration, Cincinnati, Ohio). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 243-246. 18 refs.

An experimental model involving catheterization of one lung of a rabbit with exposure to an initial low dose of ozone followed, after a latent period, by exposure of both the preexposed lung and the unexposed control lung to a high challenge dose of ozone was utilized to study the phenomenon of tolerance. Results showed that tolerance to pulmonary edema was induced by low doses of ozone (1.0 and 0.5 ppm) with only a short latent period (18 hr). It was also found that only the preexposed lung developed tolerance to pulmonary edema, whereas the lung not preexposed developed no protection. (Author)

A71-38559 Effects of exposure to ozone on defensive mechanisms of the lung. Stephen M. Alpert, Donald E. Gardner, Daniel J. Hurst, Trent R. Lewis, and David L. Coffin (U.S. Environmental Protection Agency, Cincinnati, Ohio). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 247-252. 27 refs.

Various components of the endogenous defense mechanism of the lung were studied by means of a unilateral lung exposure technique. Low levels of ozone were found to decrease cellular viability, depress various intracellular hydrolytic enzymes (lysozyme, beta-glucuronidase, and acid phosphatase), and increase the absolute number and percent of polymorphonuclear leukocytes within pulmonary lavage fluid. All these effects were dose-related and were found only in the single lung exposed to ozone and not in the contralateral lung simultaneously breathing ambient air. The responses were found to be the result of a direct toxicity of this pollutant rather than a generalized systemic response. It was concluded that the observed effects could be responsible for the increased mortality of animals given a bacterial challenge following ozone exposure. (Author)

A71-38560 Red blood cell and plasma volumes in the burro, *Equus asinus* - Desert and mountain. M. K. Yousef, D. B. Dill,

and J. D. Morris, Jr. (Desert Research Institute, Boulder City, Nev.; Nevada, University, Las Vegas, Nev.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 253-256. 31 refs. Research supported by the Nevada Heart Association; NIH Grant No. GM-15693-03; NSF Grant No. GB-17126.

Observations were made on red blood cell volume (RBCV) and plasma volume (PV) of two female burros, in the desert, during 3 weeks at the Barcroft Laboratory of the White Mountain Research Station, 3,800 m, barometric pressure 485 mm Hg, and for 40 days postaltitude. During 3 weeks at altitude PV decreased rapidly in both animals and did not return to the control level until after 1 month postaltitude. The decrease in PV was accompanied by increases in hemoglobin concentration and hematocrit. In one animal RBCV did not change, whereas in the other there appeared to be an increase at altitude beginning the 7th day; it was significantly higher throughout the 40 days postaltitude. In the burro the ratio of body hematocrit to venous hematocrit prealtitude was 0.98 contrasted to 0.93 in man. At altitude there was a significant drop in the ratio of 0.92; postaltitude it was 0.99. It appears that in the burro as in man decreased plasma volume and dependent hemoconcentration generally occur during the 1st week at high altitude. Also RBCV eventually increases but in man and burro this does not become significant within 2 weeks and may not occur within 3 weeks. (Author)

A71-38561 Urinary protein excretion in high-altitude residents. Drummond Rennie, Emilio Marticorena, Carlos Monge, and Luis Sirotzky (Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.; Universidad Peruana Cayetano Heredia, Lima, Peru). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 257-259. 21 refs. Grant No. DA-DA-17-68-C-8019.

Two-hour urine collections and venous blood samples were taken from three groups of healthy, young adult males of Quechua descent, born in the high Andes and studied in their places of permanent residence. Seventeen lived in Yauricocha (4,640 m) and twenty-six in San Cristobal (4,710 m). Thirty, who had moved down to Lima (160 m) and had lived there for more than 2 years, were studied there. Urinary protein excretion rates were increased in both groups living at high altitude, compared with the Lima group. The cause was unknown. The San Cristobal group showed relatively lower creatinine clearances. The similar hypoxia and dissimilar polycythemia in the two high-altitude groups suggested that the polycythemia rather than the hypoxia was associated with the diminished creatinine clearances in the San Cristobal men. Six other high-altitude dwellers were found to have low serum total protein and raised serum creatinine levels and were therefore not included in group comparisons. (Author)

A71-38562 Alterations in serum and extracellular electrolytes during high-altitude exposure. John P. Hannon, K. S. K. Chinn, and J. L. Shields (U.S. Army, Fitzsimons General Hospital, Denver, Colo.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 266-273. 44 refs.

The concentration and total quantity of electrolytes in serum and extracellular (thiocyanate) space were measured in nine soldiers, initially in San Antonio, Texas (200 m), and subsequently after 1, 3, 7, and 14 days' exposure in Pikes Peak (4,300 m). Altitude exposure caused a total reduction in serum bicarbonate concentration of 7.0 mEq/L. Most of this loss was replaced by an increase in chloride concentration, with minor contributions from protein anion and inorganic phosphate. The serum concentrations of sodium and calcium were unaffected by altitude exposure while the concentrations of potassium and magnesium were slightly elevated. Because of a marked reduction in extracellular space, total extracellular electrolytes, principally sodium, chloride, and bicarbonate, were similarly reduced. Total body water (4-aminoantipyrine space), on the other hand, was slightly elevated, hence calculated intracellular space was

markedly elevated. It was concluded that this high-altitude transfer of water from the extra- to the intracellular space was caused by the osmotic effects associated with a transfer of electrolytes from the extra- to the intracellular compartment. (Author)

A71-38563 **Acclimation response of pigeons to simulated high altitude.** James J. McGrath (Rutgers University, New Brunswick, N.J.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 274-276. 22 refs. Research supported by the Rutgers Research Council.

Adult male pigeons were continuously exposed to a simulated altitude of 20,000 ft (HA) in a barometric chamber for 3 weeks. Control animals were maintained under sea-level conditions. Body weights, hematocrit ratios, and hemoglobin concentrations were determined throughout the exposure period. At the end of 3 weeks, plasma volumes were determined and blood volumes were calculated. The birds were sacrificed and total heart weight (HT), right ventricle weight (RV), and left ventricle plus septal mass weight (LV) determinations were made. The HA birds initially underwent a loss in body weight which returned to normal after 3 weeks. The HA birds had higher hematocrit ratios, hemoglobin concentrations, plasma volumes, and blood volumes. The HA birds developed right ventricular hypertrophy manifest as an increase in the RV/HT and RV/LV ratios. (Author)

A71-38564 * **Regional differences in pleural and esophageal pressures in head-up and head-down positions.** Craig M. Coulam and Earl H. Wood (Mayo Clinic and Mayo Foundation; Minnesota, University, Rochester, Minn.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 277-287. 42 refs. Research supported by the American Heart Association; NIH Grants No. HE-4664; No. FR-7; No. 1 F2-HE-16-769; No. 1 F3-HE-22-351; No. AF 41(609)-68-0022; Grant No. NSG-327.

Intrapleural pressures were recorded simultaneously via liquid-filled catheters inserted percutaneously with tips positioned at apical and costophrenic surfaces of the lungs of six anesthetized dogs in head-up and head-down positions. Pressures at intermediate sites were recorded by withdrawing these catheters in steps of 1-3 cm. Head-up apical pleural pressures averaged -16.3 plus or minus 1.2 cm water and head-down basal pleural pressures averaged -16.6 plus or minus 0.8, as compared to -2.6 plus or minus 0.5 and -4.6 plus or minus 0.7, respectively, when these sites were dependent in the thorax. Vertical pressure gradients averaged 0.66 plus or minus 0.05 and 0.76 plus or minus 0.06 cm water/cm vertical distance, respectively, but were nonlinear with smaller gradients observed toward the apex in both body positions. Esophageal pressures were less negative than pleural pressures at all sites in the chest. Failure to simulate these results using physical models apparently stems from large differences in characteristics of such models and those of the pleural space, which preclude their use as a basis for assessing the physiologic significance of pleural pressures measured by different techniques. (Author)

A71-38565 **Analysis of test gas washout from lungs with varying tidal volume - Theory.** Peter Scheid and Johannes Piiper (Max Planck Institute of Experimental Medicine, Göttingen, West Germany). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 292-295. 6 refs.

The washout of insoluble test gas from single compartment lung model with tidal volume, VT, varying according to different patterns (progressive, alternating, and scattering) was studied in theory. Variation of VT caused deviations from the true values of the lung volume, VL, and the alveolar tidal volume, VAT, obtained from a regression of the logarithmic decrease of test gas concentration in expired gas on the breath number or on the cumulative tidal volume. The patterns of the deviations were complex, but with alternating

and scattering variance of VT a general trend to underestimate the lung volume, VL, the alveolar tidal volume, VAT, and their ratio, VAT/VL, was observed. On the whole, the errors caused by reasonable variations of VT are so small as to be of minor importance in lung washout analysis. (Author)

A71-38566 **Simultaneous calibration of gas analyzers and meters.** J. M. Brockway, A. W. Boyne, and J. G. Gordon (Rowett Research Institute, Aberdeen, Scotland). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 296, 297.

A method has been devised for the simultaneous calibration of the gas analyzers and gas meter used to monitor the composition of a continuous process gas stream. Pure test gases are added gravimetrically to the carrier gas stream of the system and, from the recorded responses of the measuring instruments, separate calibration factors are derived for each gas analyzer in combination with the gas meter. (Author)

A71-38567 **Wider applicability for Hill's advancing front theory of oxygen uptake.** Howard Kutchai (Oslo, University, Oslo, Norway). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 302-304. 8 refs.

Demonstration that Hill's advancing front equation approximates the kinetics of O₂ uptake by layers of hemoglobin solution in a much wider range of layer thickness and hemoglobin concentration than was hitherto supposed. It applies to O₂ uptake by layers of the same thickness as the human erythrocyte. (Author)

A71-38568 * **Chronic catheterization and handling procedures for marmosets.** Marvin L. Zatzman and Frank E. South (Missouri, University, Columbia, Mo.). *Journal of Applied Physiology*, vol. 31, Aug. 1971, p. 309-312. 12 refs. NSF Grant No. GB-17155; Grant No. NGR-26-004-025.

An autoclavable chronic catheter system and restraining box are described which can be used with marmosets. The catheters are composed of Teflon with Silastic tips and contain a positive seal that permits easy blood sampling and pressure measurement. These catheters were used for 2 years with the majority of the arterial systems remaining patent for 9 months. (Author)

A71-38571 * **Seeing and scintillation.** Andrew T. Young (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, Calif.). *Sky and Telescope*, vol. 42, Sept. 1971, p. 139-141, 150.

The irregular motion and distortion of images observed when looking through a telescope is called 'seeing,' while the rapid brightness changes of the stars is usually called 'scintillation.' Seeing and scintillation are caused by very small differences in the refractive index of air from one point to another. These differences correspond to density variations that are due to small temperature fluctuations from place to place. The consequences of these effects for astronomical observations are examined. There is an optimum aperture to use if maximum resolution is wanted. Factors for obtaining good observational conditions are discussed, together with approaches for image restoration and ionospheric scintillations of radio sources. G.R.

A71-38641 # **Automatic regulation of the volumetric blood flow rate during artificial blood circulation (Ob avtomaticheskoy regulirovani ob'emnoi skorosti krovotaka pri iskusstvennom krovoobrashchenii).** V. E. Fridman and V. P. Osipov (Ministerstvo Zdravookhraneniya SSSR, Laboratoriya Iskusstvennogo Kro-

voobrashcheniia Nauchno-Issledovatel'skoi Klinicheskoi i Eksperimental'noi Khirurgii, Moscow, USSR). *Elektromekhanika*, May 1971, p. 541-549. 8 refs. In Russian.

Description of the automated electromechanical system controlling the drive of the arterial pump ('artificial heart') of the cardiopulmonary machine. The selected method governing the regulation of the pump output with respect to venous-blood oxygen content is based on the floating control principle. Presented results of experimental performance tests are discussed. M.V.E.

A71-38677 Visual sensations produced by cosmic ray muons. W. N. Charman and Christina M. Rowlands (Manchester, University, Manchester, England). *Nature*, vol. 232, Aug. 20, 1971, p. 574, 575. 6 refs.

Cosmic ray muons traveling downward within roughly 15 deg of the vertical were selected by a counter telescope. The observers lay with their heads between the scintillators comprising the telescope. Four body positions were used, to allow study of the effects of muons passing in different directions through the eyes and head. It was found that when the muons passed through the eye, visual effects were observed. It is suggested that a direct excitation occurs on the retinal level, probably related to that occurring with X rays and with knock-on protons produced by fast neutrons. Z.W.

A71-38774 # Effects of surround luminance on perceptual latency in the fovea. Halsey H. Matteson (Tulane University, New Orleans, La.). *Optical Society of America, Journal*, vol. 61, Sept. 1971, p. 1169-1172. 18 refs. PHS Grant No. EY-00021.

The effect of surround luminance on relative latency of response to a test stimulus was measured with the perceived-order method in which asynchrony between two lights is varied to make the lights appear subjectively simultaneous. Increasing surround luminance from zero to levels high enough to impair test-stimulus detectability resulted in reduction of test-stimulus latency (facilitation of response speed) by 100 ms both in the rod-free area of the fovea and in the periphery. Since appreciable facilitation of response speed was obtained in the rod-free area of the fovea, suppression of visual noise would seem to be a more plausible explanation of the facilitation effect than inhibition of rod activity. Variation of surround luminance was also found to have a much greater effect than variation of test-stimulus luminance. (Author)

A71-38801 Right heart, pulmonary, and left heart blood volumes determined by analogue computer analysis of radiocardiograms in normal subjects and patients with mitral stenosis. Juhani Peräsalo and Timo Heiskanen (University Central Hospital, Helsinki, Finland). *Cardiovascular Research*, vol. 5, July 1971, p. 260-267. 45 refs. Research supported by the Paavo Nurmi Foundation and the Finnish Heart Foundation.

Analysis of radiocardiograms with an analog computer to determine the right heart, pulmonary, and left heart blood volumes in 15 subjects without cardiopulmonary disease and in 10 patients with mitral stenosis. The right and left heart blood volumes were both greater in the patients with mitral stenosis than in the normal subjects. The pulmonary blood volumes did not differ significantly in the groups studied. In the normal group the right and left heart blood volumes were almost equal. In patients with mitral stenosis the right heart blood volume was significantly greater than the left heart blood volume. The intracardiac blood volumes had a significant positive correlation with the radiographic heart volumes in both groups studied. The right heart blood volume had a positive correlation with the pulmonary blood volume in both groups; with the left heart blood volume this was the case only in the normal group. (Author)

A71-38802 Analogue model for the analysis of radiocardiograms. Timo Heiskanen (University Central Hospital, Helsinki, Finland). *Cardiovascular Research*, vol. 5, July 1971, p. 268-276. 16 refs. Research supported by the Finnish Heart Foundation.

A model for the analysis and the simulation of radiocardiograms is presented. The cardiac and pulmonary blood volumes can be determined by analogue computer analysis of the data measured by external scintillation counting. The application of the method for the detection and quantitation of shunts and valvular regurgitations is discussed. (Author)

A71-38803 Frequency distribution of the heart sounds in normal man. Akira Sakai, Larry P. Feigen, and Aldo A. Luisada (University of Health Sciences, Chicago, Ill.). *Cardiovascular Research*, vol. 5, July 1971, p. 358-363. 9 refs. Research supported by the F. Rippel Foundation and PHS.

The magnitude of the heart sounds at various frequencies was studied in 11 normal young men over three areas of the precordium by using a new calibrated system. The average slope of attenuation for the first heart sound was found to be -6.5 dB per octave at the apex and -7.5 dB per octave at the midprecordium. A slower decline was found for the second heart sound as the average slope of attenuation of the aortic component at the second left interspace was -6 dB per octave up to 80 Hz and no slope existed between 80 and 140 Hz. The pulmonary component of the second sound at the second left interspace had an overall slope of -3.5 dB per octave. A relative 'peaking' was found in all subjects at different frequencies with the first heart sound usually peaking at lower frequency than the second. Marked variability existed in the slope of attenuation and in the relative peaking between the various subjects. These data are discussed in terms of physiological considerations and of practical application to the design of equipment. M.M.

A71-38820 * Phosphoenolpyruvate - A new inhibitor of phosphoribulokinase in *Pseudomonas facilis*. Rodney W. Ballard and Robert D. MacElroy (NASA, Ames Research Center, Moffett Field, Calif.). *Biochemical and Biophysical Research Communications*, vol. 44, no. 3, 1971, p. 614-618. 9 refs.

Use of partially purified preparations of phosphoribulokinase from *Pseudomonas facilis* to characterize a new inhibitor of the enzyme - namely, phosphoenolpyruvate. Phosphoenolpyruvate displays a $K_{sub i}$ of .00055 M and acts as a noncompetitive inhibitor of phosphoribulokinase with respect to ribulose-5-phosphate and ATP, the substrates of the enzyme. It is suggested that phosphoenolpyruvate may function as a general regulator of phosphoribulokinase and thus of ATP-dependent carbon dioxide fixation. (Author)

A71-38824 * # An improved cell volume analyzer. J. T. Merrill, N. Veizades, H. R. Hulett, P. L. Wolf, and L. A. Herzenberg (Stanford University, Stanford, Calif.). *Review of Scientific Instruments*, vol. 42, Aug. 1971, p. 1157-1163. 27 refs. NIH Grants No. GM-17367; No. CA-04681; No. 5-TO1 GM-295-12; Grant No. NGR-05-020-004.

A cell volume sensing instrument has been built which employs the principle used in the Coulter counter in which a cell changes the impedance of a narrow orifice as it passes through the orifice. An improved transducer utilizes a coaxial flow of the cell suspension inside a sheath of cell-free solution through the orifice, thereby avoiding some drawbacks of earlier systems. The instrument is described, and the procedure necessary to achieve acceptable operation is discussed. The output for normal human red blood cells is nearly symmetrical with a narrow peak. Abnormal blood samples show various departures from symmetry and narrowness of peak. The output of this instrument is compared with that from a commercially available instrument, and our data show a more accurate representation of the actual distribution of blood volumes. The resolution of this instrument is such that it could be of significant value in a clinical laboratory. (Author)

A71-38886 Tissue respiration changes in chronic exercise - Comparison with responses to other types of stresses. Gerald D. Tharp (Nebraska, University, Lincoln, Neb.). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 29, no. 3, 1971, p. 195-202. 25 refs.

Investigation of the influence of a daily endurance type of exercise on the resting aerobic metabolism of the key tissues involved in the exercise. The oxygen consumption of tissue slices of heart, skeletal muscle, and liver of trained and nontrained rats was determined using the Warburg technique. The results show that an endurance type of training has little effect on the resting aerobic metabolism of heart or skeletal muscle tissue, regardless of the substrate employed. M.V.E.

A71-38887 Maximal aerobic and anaerobic power and stroke volume of the heart in a subalpine population. Deborah Ann Steplock, Arsenio Veicsteinas, and Massimo Mariani (Milano, Università, Milan, Italy). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 29, no. 3, 1971, p. 203-214. 22 refs. Research supported by the Consiglio Nazionale delle Ricerche.

Maximal aerobic and anaerobic power, fat free body weight, maximal cardiac output, stroke volume of the heart and the O₂ capacity of the blood were measured on 145 subjects in the age range 9-64 selected at random on a population of a subalpine area of Northern Italy. The discussed results include the finding that maximal cardiac output may be a linear function of maximal aerobic power. M.V.E.

A71-38888 Effect of alkalosis on performance and lactate formation in supramaximal exercise. R. Margaria, P. Aghemo, and G. Sassi (Milano, Università, Milan, Italy). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 29, no. 3, 1971, p. 215-223. 13 refs. Research supported by the Consiglio Nazionale delle Ricerche.

Investigation of the effect of an increased base binding power of the blood, induced by alkali administration to subjects performing a supramaximal exercise, on the maximal performance time, or on the total amount of lactic acid in the blood, or on the rate of appearance of lactic acid therein. The results obtained indicate no appreciable effect of this kind. M.V.E.

A71-38889 Evolution of some circulatory, respiratory, and metabolic parameters during physical exercise performed in a noisy environment (Evolution de quelques grandeurs circulatoires, respiratoires et métaboliques au cours de l'effort physique accompli en milieu bruyant). S. Degré, P. Vandermoten, R. Messin, and H. Denolin (Hôpital St. Pierre; Ecole de Santé Publique, Brussels, Belgium). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 29, no. 3, 1971, p. 234-248. 17 refs. In French. CECA-supported research.

In order to investigate the effects of noise on some major physiological parameters, light, moderate, and heavy physical exercises were performed by 23 normal subjects in a continuously noisy (80-110 dB) environment and in a soundproof room. Heart rate, systolic blood pressure, oxygen intake, ventilation, respiratory equivalent for oxygen, and respiratory quotient were measured at each intensity of effort. Parameters measured in noise and in silence showed no significant differences. M.V.E.

A71-38890 Determinants of marathon running success. David L. Costill, George Branam, Duane Eddy, and Kenneth Sparks (Ball State University, Muncie, Ind.). *Internationale Zeitschrift für*

angewandte Physiologie einschliesslich Arbeitsphysiologie, vol. 29, no. 3, 1971, p. 249-254. 15 refs. Research supported by the Ball State University.

Metabolic responses during submaximal and maximal treadmill running were measured for a world champion marathon runner. Oxygen consumption, heart rates, and lactic acid were recorded during a series of 8 submaximal and 2 maximal trials. When compared with other marathon runners, this subject demonstrated little superiority with respect to either aerobic capacity or the energy requirements at various running speeds. The findings of the investigation suggest that marathon running success is dependent upon running economy and the ability to utilize a large fraction of a well developed aerobic capacity. M.V.E.

A71-38891 Analysis of the factors determining the slow variations in heart rate during and after muscle exercise (Analyse des facteurs déterminant les variations lentes de fréquence cardiaque pendant et après l'exercice musculaire). J. J. Vogt, H. Freund, A. Peller, and G. Marbach (CNRS, Centre d'Etudes Bioclimatiques, Strasbourg, France). *Internationale Zeitschrift für angewandte Physiologie einschliesslich Arbeitsphysiologie*, vol. 29, no. 3, 1971, p. 255-284. 34 refs. In French. Research supported by the Délégation Générale à la Recherche Scientifique et Technique.

Discussion of the results obtained in investigating the heart rate, rectal temperature, mean skin temperature, blood lactate, pyruvate, and glucose in 4 subjects during and after exercise at varying work loads (75 to 135 W) at two thermal levels (neutral and hot). It is shown that one single theoretical equation makes it possible to predict heart rate levels at rest or at work, in a neutral, as well as in a hot environment. M.V.E.

A71-38892 # Distribution of cholesterol and esterified cholesterol in the human skin (Verteilung von Cholesterin und Cholesterinestern in der menschlichen Haut). H. Meffert and E. Schnarrer (Jena, Universität, Jena, East Germany). *Acta Biologica et Medica Germanica*, vol. 26, no. 5, 1971, p. 969-974. 15 refs. In German.

Human surface fat, epidermis, corium, subcutaneous tissue, and serum were analyzed by thin layer chromatographic/colorimetric and by gaschromatographic methods. It was found that the esterified cholesterol of the surface fat are saturated (more than 95%), while in the epidermis esters of unsaturated fatty acids prevail. Esters of saturated fatty acids are predominantly present in the corium, and esters with unsaturated fatty acids containing two double bonds predominate in the serum. The largest relative amount of sterols regarding the total content of lipids was found in the epidermis. G.R.

A71-38893 # Plasma renin activity in essential hypertonic and normotonic persons exposed to exogenous stress (Die Plasmarenin-Aktivität bei exogener Belastung von essentiellen Hypertonikern und Normotonikern). W. Hartrodt, K. H. Brosowski, Ch. Kreher, Ch. Graff, H. Ziprian, and R. Baumann (Deutsche Akademie der Wissenschaften, Institut für Kortiko-Viszerale Pathologie und Therapie, Berlin, East Germany). *Acta Biologica et Medica Germanica*, vol. 26, no. 5, 1971, p. 1013-1019. 45 refs. In German.

The plasma renin activity (PRA) was measured according to a modified micromethod based on procedures by Boucher et al. (1967) and Arakawa et al. (1968). The PRA was determined in male subjects which were in a recumbent position and had been given arithmetic tests. The results obtained were compared with PRA values measured while the persons were at rest and in orthostasis. It was found that the PRA's showed an increase between rest and arithmetic test or between the arithmetic test and orthostasis. A comparison of mean values between normotonic and hypertonic persons at rest reveals similar values. However, the PRA increments measured in persons under stress were higher for hypertonic patients. G.R.

A71-38894 # An analogous electronic functional model of the external functions of primary biological receptor elements (Zum Tremorin-Oxotremorinstoffwechsel bei Kücken). J. Klinger, B. Zimmermann, W. Oelszner, H.-D. Fischer, and K. Westermann (Medizinische Akademie, Magdeburg, East Germany). *Acta Biologica et Medica Germanica*, vol. 26, no. 5, 1971, p. 1021-1038. 30 refs. In German.

Single receptors and simple receptor fields which are found associated with the great majority of the sense organs of animal species are used as a basis for the design of the model. For stimuli of different characteristics the model can provide the receptor potentials and the afferent pulse trains which are associated with phasic, phasic-tonic, and tonic on-, on-off, and off-elements. The model characteristics include a spatial and temporal summation capacity and a threshold adjustable in its height, spontaneous activity, accommodation, sensibility, and fusion frequency. G.R.

A71-38912 Review of thermoelectric conversion in micro/milliwatt power range for bio-medical applications. Valvo Raag (Resalab, Inc., Northvale, N.J.). In: Society of Automotive Engineers, Intersociety Energy Conversion Engineering Conference, Boston, Mass., August 3-5, 1971, Proceedings. Conference co-sponsored by the American Chemical Society, the American Institute of Aeronautics and Astronautics, the American Society of Mechanical Engineers, the Institute of Electrical and Electronics Engineers, the American Institute of Chemical Engineers, and the American Nuclear Society. New York, Society of Automotive Engineers, Inc., 1971, p. 245-255.

The design considerations of micro- and milliwatt radioisotope thermoelectric generators (RTGs) for biomedical applications are examined, and conclusions are drawn with regard to the advantages and disadvantages of the most common RTG technologies in this field. The conclusions are illustrated by detailed design analyses of a 64.8 milliwatt RTG using silicon-germanium, lead telluride, bismuth telluride, and Cupron-Tophel wires. Silicon-germanium RTGs offer the highest conversion efficiency in the mid to high milliwatt power range. Wire thermocouple RTGs exhibit the lowest conversion efficiency at all power levels, but do enable the attainment of high direct output voltages. Silicon-germanium RTGs provide the highest direct output voltages at all power levels. T.M.

A71-38959 # Some effects of noise on man. Charles W. Nixon (USAF, Aerospace Medical Research Laboratory, Wright-Patterson AFB, Ohio). In: Society of Automotive Engineers, Intersociety Energy Conversion Engineering Conference, Boston, Mass., August 3-5, 1971, Proceedings. Conference co-sponsored by the American Chemical Society, the American Institute of Aeronautics and Astronautics, the American Society of Mechanical Engineers, the Institute of Electrical and Electronics Engineers, the American Institute of Chemical Engineers, and the American Nuclear Society. New York, Society of Automotive Engineers, Inc., 1971, p. 1024-1033. 22 refs.

Brief review of laboratory experimentation and noise exposure experience over the years, in order to demonstrate that there are many types of acoustic exposure which do affect the physiological and psychological functions of man in different ways. Implications of these effects for general health and well-being are mentioned. It is pointed out that the primary reason for noise abatement is to eliminate deleterious effects on man. Consequently, it is important that personnel who implement noise control measures understand what human responses are to be expected when man experiences various categories of noise exposure. M.M.

A71-38968 * Action of pharmacologic agents in experimental cardiac tamponade. Robert E. Finegan, Marianne Schroll, Sheryllyn Robison, and Donald C. Harrison (Stanford University, Palo

Alto, Calif.). *American Heart Journal*, vol. 81, Feb. 1971, p. 220-226. 8 refs. NIH Grants No. HE-09058; No. HE-5709; No. HE-05866; Grant No. NGL-05-020-305.

Cardiac tamponade was produced in 14 dogs by infusing saline into the pericardial space. The effects of isoproterenol, atrial pacing, ouabain, and methoxamine were studied after the animals resumed spontaneous respiration. Tamponade significantly reduced arterial pressure, stroke volume, and cardiac output, and significant increases in right atrial pressure, heart rate, and systemic vascular resistance were observed. The administration of isoproterenol resulted in an increase in stroke volume, heart rate, and cardiac output and reduced systemic vascular resistance even when right atrial pressure was maintained by further volume infusion. It appears that an ideal pharmacologic agent for reversing the hemodynamic alterations of acute cardiac tamponade should have positive inotropic effects to reduce end-systolic volume and maximize the ejection fraction, and an ideal agent should also increase heart rate and reduce systemic vascular resistance. Isoproterenol combines all of these properties. M.M.

A71-38970 A study of possible biochemical mechanisms involved in hyperbaric oxygen-induced changes in cerebral gamma-aminobutyric acid levels and accompanying seizures. J. D. Wood, M. W. Radomski, and W. J. Watson (Saskatchewan, University, Saskatoon, Saskatchewan; Defence Research Establishment Toronto, Downsview, Ontario, Canada). *Canadian Journal of Biochemistry*, vol. 49, no. 5, 1971, p. 543-547. 16 refs. Research supported by the Defence Research Board and the Medical Research Council of Canada.

A linear correlation was obtained between the relative rate of gamma-aminobutyric acid (GABA) metabolism in chicks of different ages during a period of rapid brain development and the susceptibility of the birds to seizures induced by hyperbaric oxygen (O.H.P.). Since the changes taking place with age in the activities of the two enzymes involved in GABA metabolism (glutamic acid decarboxylase and GABA-alpha-ketoglutarate transaminase) were similar, the enzyme system primarily responsible for the O.H.P.-induced decreases in cerebral GABA levels and accompanying seizures could not be identified. Both enzyme systems may be involved. The possible involvement of an increased transport of GABA through cellular membranes in the production of low cerebral GABA levels could not be demonstrated in the present experiments. (Author)

A71-38976 Radiation exposure in air travel. Hermann J. Schaefer (U.S. Naval Aerospace Medical Center, Aerospace Medical Research Laboratory, Pensacola, Fla.). *Science*, vol. 173, Aug. 27, 1971, p. 780-783. 8 refs.

Comparative evaluation of the environmental radiation levels at conventional jet and SST altitudes. It is pointed out that the level of galactic radiation per mile for the SST is smaller than that for the conventional jet. The SST encounters a higher level of radiation, but it travels so much faster that the integral dose accumulated over the same distance is smaller. However, if population doses are to be assessed and projected into the future, the number of passenger hours at altitude is the relevant quantity. The public health aspects of environmental radiation are considered. M.M.

A71-38979 * L-dopa - Disaggregation of brain polysomes and elevation of brain tryptophan. Bette F. Weiss, Hamish N. Munro, and Richard J. Wurtman (MIT, Cambridge, Mass.). *Science*, vol. 173, Aug. 27, 1971, p. 833-835. 18 refs. Research supported by the Hoffmann-LaRoche Co.; PHS Grant No. AM-14228; Grant No. NGR-22-009-272.

One hour after administration of L-dopa (50 to 300 milligrams per kilogram), there is a marked disaggregation of brain polysomes in immature rats. Adult animals show a similar response, but require larger doses of the amino acid (500 milligrams per kilogram). Single doses of L-dopa significantly elevate amounts of tryptophan in the brain; hence their effect on polysomes does not result from the unavailability of this amino acid. (Author)

A71-38980 **Effects of polycythemia and altitude hypoxia on rat heart and exercise tolerance.** Paul D. Altland (National Institutes of Health, National Institute of Arthritis and Metabolic Diseases, Bethesda, Md.) and Benjamin Highman (U.S. Army, Institute of Pathology, Washington, D.C.). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 388-393. 20 refs.

The effects of 2-6 weeks exposure of rats to 18,000 or 25,000 ft 5 hr daily on tolerance to sea-level walking (12.9 m/min) were determined. At 18,000 ft severe polycythemia developed without affecting sea-level exercise performance. At 25,000 ft additional findings were lipoidosis in liver cells and kidney arteries, apical myocardial lesions, and reduced sea-level exercise performance. Fatigue occurred in 183 min after 4 weeks at altitude and in 124 min after 6 weeks. Controls fatigued after 196 min. Cobalt-induced polycythemia did not alter exercise performance. Repeated bleeding during 6 weeks at 25,000 ft prevented development of polycythemia and changes in sea-level exercise performance and minimized pathological changes. Following exposure to 25,000 ft polycythemia and exercise performance returned to normal within 4 weeks, but myocardial lesions persisted for 6 weeks. Hypoxia was found to be the principal factor responsible for the reduced exercise performance, with associated myocardial lesions and severe polycythemia contributing secondary factors. (Author)

A71-38981 **Tissue temperatures and whole-animal oxygen consumption after exercise.** George A. Brooks, Karl J. Hittelman, John A. Faulkner, and Robert E. Beyer (Michigan, University, Ann Arbor, Mich.). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 427-431. 23 refs. Research supported by the Western Electric Co., the University of Michigan, and the Michigan Heart Association; NIH Grant No. AM-10056-05; NSF Grant No. GB-13496.

Experimental study in which forced treadmill running caused rat muscle and rectal temperatures to increase 8.1 and 5.1°C, respectively. After exercise, muscle temperature fell exponentially but did not reach control values in an hour. Rectal temperature fell rapidly for the first 20 min after exercise, after which only a slow rate of return to resting levels was apparent. An exercise-induced adjustment in the hypothalamic set point was suggested. O₂ consumption was high immediately after exercise, declined rapidly for the first 20 min of recovery, and then plateaued at a level significantly above resting. The hypothesis that a sizable portion of postexercise O₂ consumption is due to increased tissue temperatures is substantiated. The fact that severe exercise results in a large, prolonged elevation in tissue temperature necessitates, as a consequence of the Q₁₀ effect, that O₂ consumption be significantly elevated. Since a part of the postexercise O₂ consumption is not associated with recovery from anaerobic metabolism, the classical definition of O₂ debt requires revision. (Author)

A71-38982 **Amino acid levels in plasma, liver, muscle, and kidney during and after exercise in fasted and fed rats.** J. Christophe, J. Winand, R. Kutzner, and M. Hebbelinck (Bruxelles, Université Libre, Brussels, Belgium). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 453-457. 31 refs. Research supported by Fonds de la Recherche Scientifique Médicale.

Young male rats were forced to swim for 15 or 30 min as a single exercise or after a 10-day period of training. When swimming

for 15 min only, these rats were sacrificed immediately or after a 15-min rest. Acute exercise lowered the levels of glutamine in plasma and in the three tissues examined (liver, gastrocnemius, and kidney). The maximum decrease of glutamine was measured in the liver and proved to be 50 per cent of the resting level. These changes were usually accompanied by significant depressions of glutamate. Swimming also induced increases in aspartate and serine in the liver and a decrease of glycine. The data are probably related, among other factors, to increased gluconeogenesis and an enhanced activity of glutaminase consequent to metabolic acidosis. (Author)

A71-38983 **Relationship between phrenic nerve activity and ventilation.** Frederic L. Eldridge. *American Journal of Physiology*, vol. 221, Aug. 1971, p. 535-543. 23 refs. PHS Grant No. HE-03224.

Phrenic nerve discharges were recorded in anesthetized cats simultaneously with a range of tidal volumes. Nerve impulses were processed in a variety of ways. Total impulses per breath and peak impulse frequency correlated poorly with tidal volume. Integrated electrical activity per breath showed an improved, often linear, correlation with tidal volume, but was too dependent upon inspiratory duration to be a satisfactory correlate of volume. Only integrated phrenic activity measured during the 0.1 sec coincident with the peak of inspiration showed a consistently linear relationship with tidal volume under a variety of circumstances, including increasing barbiturate dosage, vagal section, and spinal cord transection below the phrenic roots. Analysis of the relationships between phrenic impulse rate and integrated electrical activity shows that with increased tidal volume there is a progressive increase in size of phrenic action potentials which correlate in turn with the size of the diaphragmatic motor unit. (Author)

A71-38984 * **Water intake and urine output of mice during chronic centrifugation.** Charles C. Wunder, Frederic N. Meyer, Mary E. Clark, and Howard H. Bengel (Iowa, University, Iowa City, Iowa). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 559-563. 18 refs. Grant No. NGR-16-001-031.

Although various animals can survive, grow, and even breed throughout chronic centrifugation, growth and longevity of mice decrease with field intensity. Fields of 2.2, 4, or 7 G caused decreased water intakes, which were most pronounced during the 1st day and which were progressive with field intensity for 190 male, Swiss Webster mice, 5 weeks of age at the onset of exposure. Unlike these progressive decrements of intake, changes of urine flow with increasing field are more complex. In contrast to the increased flow reported by Bengel from this laboratory for 1.7- and 3-G rats under similar conditions, no change was measurable throughout 14 days at 2.2 G while 4-G mice demonstrated decreased flow. Flow increased at 7 G. Although 54, 1-G, pair-fed, control mice exhibited 3 weeks of growth comparable to that of their high-G counterparts, the reduced food intake alone cannot explain the urinary results, as pair feeding resulted in greater flow than with either ad libitum feeding or high-G exposure. (Author)

A71-38985 **Cell contacts in duodenal smooth muscle layers.** Ruth M. Henderson, Gusztav Duchon, and Edwin E. Daniel (Alberta, University, Edmonton, Alberta, Canada). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 564-574. 45 refs. Research supported by the Medical Research Council of Canada.

Two types of cell contacts are described in canine duodenal smooth muscle, perfused in situ with glutaraldehyde fixative. The first is the five-layered junction or nexus. This junction is found only in the circular muscle and therefore cannot participate in electrical coupling in the longitudinal layer. The second type, which occurs largely in the longitudinal layer but also occasionally in the circular,

consists of a region with parallelism of cell membranes, increased cytoplasmic density, an intercellular space of approximately 50 nm (500 Å), and a central denser line. Experiments in which cells were shrunk by perfusion with a hypertonic solution or strongly contracted by acetylcholine or high potassium left both types of contact intact. This indicates that they are resistant to mechanical separation, and also that the observed uncoupling of slow waves in intestinal muscle under these conditions cannot be due simply to gross disruption of nexuses. (Author)

A71-38986 **Role of respiratory chemoreceptors in adrenocortical activation.** C. Lau (Illinois, University, Chicago, Ill.). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 602-606. 21 refs. Contract No. NR-101-580.

Investigation conducted to determine the role played by acid-base alterations on the adrenal cortex. Peripheral chemoreceptor denervation or sham operation was performed on dogs subjected for 1 hr to 10% O₂ + 5% CO₂ 10% O₂ + 10% CO₂ hyperventilation, and 20% O₂ + 10% CO₂. Adrenocortical stimulation in sham intact dogs exposed to the hypoxic gas mixtures was less marked than that noted in a previous study in animals breathing 10% O₂ alone; no change was found during hyperventilation, and a decrease was observed in animals respiring 20% O₂ + 10% CO₂. Peripheral chemoreceptor-denervated dogs manifested no alteration in adrenocortical output when exposed to any of the above gas mixtures, even though the changes in arterial O₂ and CO₂ tensions and pH showed no significant differences from those in sham intact animals. It appears from these studies that stimulation of the adrenal cortex in pentobarbital anesthetized dogs requires the integrity of the buffer nerves, is responsive primarily to oxygen lack, and is secondarily modulated by acid-base variations. (Author)

A71-38987 * **Transmission of small pressure waves in the canine vena cava.** Max Anliker, William G. Yates, and Eric Ogden (NASA, Ames Research Center, Environmental Biology Div., Moffett Field; Stanford University, Stanford, Calif.). *American Journal of Physiology*, vol. 221, Aug. 1971, p. 644-651. 17 refs. Grant No. NGR-05-020-223.

Attempt to acquire quantitative data which will aid in the development of a mathematical model for the mechanical behavior of large veins. Artificially induced sinusoidal pressure waves propagating in the abdominal venae cavae of anesthetized dogs are shown to be only mildly dispersive. For frequencies between 20 and 110 Hz, the speed ranged from 100 to 350 cm/sec, depending on the transmural pressure and the physiological state of the animal. The wave speed increased by 1 to 5 cm/sec per mm H₂O when the pressure was raised by blocking the venous return. The wave amplitudes were attenuated exponentially with distance traveled, and the attenuation per wavelength was independent of frequency. Values of the logarithmic decrement for amplitude decay ranged from 0.6 to 3.3. The results imply that the viscoelasticity of the wall is the dominant damping mechanism in the frequency range considered, and thus the observed attenuation pattern serves as the basic condition to be met by any mathematical model for the viscoelastic behavior of the vessel wall. (Author)

A71-39040 **Occurrence of a deep breath after a period of airway occlusion.** G. Sant'Ambrogio, J. Milic-Emili, and E. Camprosi (Milano, Università, Milan, Italy). *Pflügers Archiv*, vol. 327, no. 2, 1971, p. 95-104. 12 refs. Research supported by the Consiglio Nazionale delle Ricerche.

Experiments with anesthetized rabbits are described which show that after a period of airway occlusion, the tidal volume is greater and longer than the following volumes. The magnitude of these

effects is proportional to the intrapulmonary pressure which develops during the last inspiratory effort before reopening of the airway. These phenomena vanish when the vagal nerves are severed. It is suggested that these effects are related to the stimulation of Mills, Sellick, and Widdicombe's (1970) 'lung irritant receptors' sensitive to changes in lung compliance and to congestion of pulmonary circulation. V.P.

A71-39041 **Continuous recording of human rectal temperature under extreme conditions (Fortlaufende Registrierung der Rectaltemperatur des Menschen unter extremen Bedingungen).** R. Wever (Max-Planck-Institut für Verhaltensphysiologie, Seewiesen, West Germany) and R. A. Zink (München, Universität, Munich, West Germany). *Pflügers Archiv*, vol. 327, no. 2, 1971, p. 186-190. 11 refs. In German. Research supported by the Deutsche Forschungsgemeinschaft.

Battery-powered thermographs (90 x 70 x 30 mm; 350 g) are described which use small thermistor probes to record continuously the rectal temperature under extreme environmental conditions without inconveniencing the subjects. The precision of temperature measurements is better than 0.1 C. V.P.

A71-39070 * **Effects of long-term shock and associated stimuli on aggressive and manual responses.** R. R. Hutchinson, J. W. Renfrew, and G. A. Young (Western Michigan University, Kalamazoo, Mich.; Fort Custer State Home). *Journal of the Experimental Analysis of Behavior*, vol. 15, Mar. 1971, p. 141-166. 65 refs. Research supported by the Michigan Department of Mental Health and the Illinois Department of Mental Health; NSF Grants No. GB-5980; No. GB-8535; Grant No. NGR-23-010-004; Contract No. N 00014-69-C-0253.

Systematic investigation of the effects of long-term exposure to shock and associated stimuli. Squirrel monkeys were exposed to frequent electric shock over many sessions. Shock was always delivered independently of any feature of the subjects' performance. Biting a rubber hose, depressing a response lever, and pulling a hanging chain were the particular responses studied. F.R.L.

A71-39072 # **Some physical problems of lung scanning.** V. Hušák (University Hospital, Olomouc, Czechoslovakia). *Radio-biologia - Radiotherapia*, vol. 12, no. 1, 1971, p. 87-101. 33 refs.

Investigation of an optimum choice for a suitable detector, an adjustment of electronic equipment, and a radionuclide as well as a labeled compound for lung scanning. A relationship involving almost all parameters encountered in scanning is derived whereby the resolution of the collimator can be determined from an activity administered, a given time allowed for the scan, and other known parameters. Expressions for the contrast over an inactive defect located in the lung tissue and for the minimum detectable size of the defect make it possible to compare various radionuclides from the standpoint of their energy. A comparison is made of radionuclides and labeled compounds according to the photon yield and the absorbed dose in the lungs using a Beck (1966) criterion. It is shown that technetium-99m and iodine-131 are almost equivalent from the viewpoint of the contrast but technetium-99m is much more advantageous when the absorbed dose is considered. The results are useful in clinical practice and explain the physical basis of some empirical findings. M.M.

A71-39073 * **Reliability and correlates of a three-phase code transformation task (3P-COTRAN).** Glynn D. Coates and Earl A. Alluisi (Louisville, University, Louisville, Ky.). *Perceptual and Motor Skills*, vol. 32, June 1971, p. 971-985. 5 refs. Grant No. NGR-18-002-008.

In a further experimental test of a three-phase code transformation task, 84 Ss solved 6 blocks of 3 problems, and later spent 6 hr in responding to paper-and-pencil tests of intelligence and certain personality characteristics. A factor analysis of 75 measures led to the identification of 8 factors, 5 of which represent 3P-COTRAN performances, 1 verbal intelligence, and 2 personality characteristics. Analyses based on 9 selected measures indicated differential practice effects, with the problem-solving third phase of the task being more slowly learned. Reliability of the measures and correlates of the task were computed and discussed. (Author)

A71-39134 # Results of biological studies performed on the Zond 5, Zond 6, and Zond 7 stations (Rezultaty biologicheskikh issledovaniy, vypolnennykh na stantsiyakh 'Zond-5,' 'Zond-6,' i 'Zond-7'). O. G. Gizenko, V. V. Antipov, and G. P. Parfenov. (International Astronautical Federation, International Astronautical Congress, 21st, Konstanz, West Germany, Oct. 4-10, 1970.) *Kosmicheskie Issledovaniia*, vol. 9, July-Aug. 1971, p. 601-609. 20 refs. In Russian.

Analysis of the main results of biological experiments performed in spacecraft on various plants, animals, and bacteria. Flight conditions were found to be the cause of specific alterations in the physiological functions and hereditary structures of a number of the investigated objects. Flight conditions are held to be responsible for stimulation of growth and development in wheat and barley seeds and *Allium cepa* shoots, the induction of chromosome mutations in these objects, and moderate activation of a prophage in lysogenic bacteria. A.B.K.

A71-39205 # Indices of windchill of clothed persons. R. G. Steadman (Manitoba, University, Winnipeg, Manitoba, Canada). *Journal of Applied Meteorology*, vol. 10, Aug. 1971, p. 674-683. 20 refs. Research supported by the University of Manitoba.

The concept of windchill as a measure of the combined effects of low temperature and wind is reviewed. An analysis is presented of the effect of these variables on a person dressed for cold climates and takes account of all important modes of heat loss, including breathing and heat transfer through clothing. This analysis leads to two chief indices of windchill: the windchill equivalent temperature, which is tabulated and compared with existing tables, and the clothing thickness required to maintain a person in thermal equilibrium. The distributions of clothing thickness and of the windchill of exposed skin at 30 C are described. (Author)

A71-39217 # Human efficiency under weightlessness conditions (Rabotosposobnost' cheloveka v usloviakh nevesomosti). A. A. Korobova and T. I. Goriunova. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 3-11. 75 refs. In Russian.

Physicotechnical and biomedical aspects of the weightlessness problem are discussed on the basis of a review of the current status of our knowledge on the coordination of motions as a function of the muscular system and general capacity for work. The principal questions studied are the nature of impairment of coordination, changes in the motor function under subgravity conditions, adaptation to actual and simulated weightlessness conditions, and the role of physical exercises in the adaptation to these conditions. V.P.

A71-39218 # Influence of prolonged hypokinesia on the serotonin metabolism of rats (Vlianie dlitel'noi gipokinezii na obmen serotoninina u krysi). Z. S. Dolgun, S. P. Novikova, and V. S. Shashkov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 12-16. 19 refs. In Russian.

An investigation is described, showing that hypokinesia has a substantial influence on the serotonin (5-HT) metabolism. The most

pronounced deviations from the normal 5-HT content in blood and in the duodenal tissues were observed during the first to third day and the thirteenth to fifteenth day of hypokinesia. The same applies to the discharge of 5-hydroxyindole acetic acid (a 5-HT metabolite) with urine. Hypokinesia lasting more than 60 days leads to a substantial increase in 5-HT content in the blood, the content remaining above normal for as long as 45 days after termination of hypokinesia. V.P.

A71-39219 # Interrelation between the indices of general and tissular resistance of rats (in the case of muscular training, adaptation to cold, and administration of dibazol) (Vzaimosvyez' mezhdu pokazatelyami obshchei i tkanevoi rezistentnosti krysi /pri myshechnoi trenirovke, adaptatsii k kholodu i vvedeniiakh dibazola/). V. Ia. Rusin. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 16-20. 16 refs. In Russian.

It is shown that an increase in the resistance of an intact organism to various adverse effects as a result of muscular training, adaptation to cold, and administration of dibazol is accompanied by increased resistance at the tissular and cellular levels. This indicates that the effectiveness of means and methods of increasing the biological reserves of an organism can be controlled by simple (in the methodological sense) criteria of tissular and cellular resistance. V.P.

A71-39220 # Cultivation of mammalian cells at 'suboptimal' temperatures (Kul'tivirovaniye kletok mlekoopitaishchikh pri 'suboptimal'nykh' temperaturakh). F. V. Sushkov, Z. L. Sorvacheva, and V. V. Portugalov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 20-23. 10 refs. In Russian.

Cultures of L, HeLa, and BHK-21 cells, human amnion and kidney A-1, FL, RH cell strains and hamster 237 and 431 substrains were grown at temperatures of 37 C and 28 to 36 C. Cultures of L, A-1, and BHK-21 cells and the hamster cells are found to be capable of mitotic division at 30 and 28 C. Reproduction of L cells could be maintained under these conditions during 19 months, and of the other cells during 20 to 40 days. Substantial cytophysiological changes observed for L cells during the adaptation process indicate that this process is of a purely phenotypical nature. V.P.

A71-39221 # Reflex activity of spinal marrow in intact and labyrinthectomized animals subjected to radial accelerations (Refleksnaya aktivnost' spinnoy mozga u normal'nykh i delabirintirovannykh zhivotnykh pri deistvii radial'nykh uskorenii). G. S. Aizikov, M. D. Emel'yanov, V. G. Ovechkin, and G. V. Tumanov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 23-27. 18 refs. In Russian.

The H-reflex evoked in intact and labyrinthectomized rats at head-to-pelvis accelerations ranging from 0.5 to 8 g are studied. It is found that these accelerations produced substantial changes in the H-reflex. At accelerations of 0.5 g, the H-reflex increased in amplitude, and became normal after acceleration was discontinued. At accelerations of 2.4 and 8 g, the H-reflex was inhibited in direct proportion to the acceleration. The restoration time of the H-reflex also increased with increasing acceleration. The functional state and activity of the motor analyzer during acceleration was defined by such factors as reflex changes of the motor neuron activity associated with muscular reception, and vestibular stimulation. V.P.

A71-39222 # Influence of abdomen and head shielding during gamma-irradiation of dogs on the content of protein fractions in the blood serum (Vlianie ekranirovaniya oblasti zhivota ili golovy pri gamma-obluchenii sobak na soderzhanie belkovykh fraktsiy)

syvorotki krvi). B. I. Davydov, Iu. K. Syzrantsev, and B. L. Razgovorov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 27-30. 10 refs. In Russian.

Dogs were exposed to a 600-r dose of gamma radiation, with doses of 150 and 300 r behind the shield on the abdomen and a dose of 150 r behind the head shield. Protein fractions in the blood serum were measured by paper electrophoresis. The tests revealed a reduction in the albumin-globulin ratio, regardless of shielding, an increase in the beta-globulin content with normalization after 100 days at a residual dose of 150 r behind the abdomen shield, and an increase in the albumin-globulin ratio, essentially on account of the alpha sub 2 fraction. An increase in the globulins after 40 to 60 days after irradiation correlated with an abrupt increase in glutamate aspartate transferases. Abdomen screening at a dose of 600 r was found to reduce the damaging effect of radiation on the blood protein-fraction synthesis to a greater extent than head shielding.

V.P.

A71-39223 # Role of motor and vestibular analysors and frontal hypothalamus in the compensation for gravitational loads during orthostasis (Znachenie motornogo, vestibuliarnogo analizatorov i perednogo gipotalamusa v kompensatsii gravitatsionnoi nagruzki pri ortostaze). G. S. Belkaniia. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 31-36. 11 refs. In Russian.

Experiments with intact cats and cats subjected to curarization, bilateral vestibular deafferentation, and electrocoagulation of the frontal hypothalamus revealed phasic changes in respiration, arterial pressure, and brain bioelectric activity during orthostasis. The rate of development of orthostatic collapse was found to correlate distinctly with the fluctuations in arterial pressure during the second phase of the primary orthostatic reaction. This indicates the prognostic significance of this correlation. Deactivation of the vestibular and motor analysors or the electrocoagulation of the frontal hypothalamus was found to decrease substantially the gravity function during orthostasis.

V.P.

A71-39224 # Establishment of physiological principles of rational heat removal in an individual isolating suit (K obosnovaniyu fiziologicheskikh printsipov ratsional'nogo teplos'ema v individual'nom izoliruiushchem snariazhenii). S. M. Gorodinskii, G. V. Bavro, and G. A. Ivanov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 36-42. 19 refs. In Russian.

Physiological approaches to the problem of heat removal from a space suit are studied experimentally. Parts of the human body best suited for heat removal owing to their anatomic and physiological features are determined. It is shown that heat removal from areas above the principal muscular systems of the extremities is less effective than from areas above tendons and weakly expressed muscular layers. This type of cooling has also the advantage of avoiding a decrease in muscular performance due to overcooling.

V.P.

A71-39225 # Utilization of color-music during the performance of an operator under conditions of isolation (K voprosu ob ispol'zovanii tsvetomuzyki pri rabote operatora v usloviakh izoliatsii). Iu. A. Petrov and L. N. Mel'nikov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 42-45. 19 refs. In Russian.

Current concepts of using color effects in combination with music to distract an operator in an isolated environment and to counteract possible impairment of his psychophysiological activity are examined. Results of theoretical and experimental investigations are used as a basis for formulating principles of developing color-music programs.

V.P.

A71-39226 # Human-operator models in the investigation of spacecraft manual control (Modeli cheloveka-operatora pri issledovanii ruchnogo upravleniya kosmicheskimi korablami). R. V. Komotskii, S. A. Minaev, and A. E. Chebyshev. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 45-50. 14 refs. In Russian.

Means of replacing the human operator by models of various classes of operator performance are discussed. Block and circuit diagrams of models described by a linear transfer function with variable coefficients are examined. Approaches to the construction of a universal model suitable for complex studies of operator performance in its most general form are evaluated.

V.P.

A71-39227 # Cytogenetic studies related to a space flight of man (Tsitogeneticheskie issledovaniya v svyazi s kosmicheskim poletom cheloveka). L. P. Grinio, T. N. Krupina, and N. N. Bobkova. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 51-55. 25 refs. In Russian.

A chromosome analysis was carried out in peripheral blood leukocytes from 4 healthy men after 120 day hypokinesia, and cytogenetic tests on Soviet astronaut Beregovoi prior to and after his space flight. An increase in chromosome aberrations in the subjects or significant changes in the chromosome apparatus of the astronaut could not be established by the study. It is concluded that the Soiuz 3 flight of Beregovoi was safe in terms of cytogenetic radiation damage.

V.Z.

A71-39228 # Changes in human retinal blood circulation under transversely directed acceleration (Izmeneniya v retinal'nom krovoobrashchenii cheloveka pri poperechno napravlennom uskorenii). A. S. Barer and E. A. Sokol. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 55-60. 8 refs. In Russian.

Dark chamber teleophthalmoscopy was applied in a study of blood circulation in the retinas of 19 subjects exposed to transverse accelerations of 4 to 12 g increased by 2-g steps at a speed of about 0.2 g/sec. One per cent homatropine was used to produce mydriasis during observations. Accelerations of 10 and 12 g caused blood stream discontinuities in retinal vessels, accompanied by disturbance of vision, and the blood content in the vessels was decreased when accelerations of 6 and 8 g were applied. Possible mechanisms of these effects are discussed.

V.Z.

A71-39229 # Specific features of reactions of the nasal vascular system during 120-day hypokinesia (Osobennosti reaktsii sosudistoi sistemy nosa v usloviakh 120-sutochnoi gipokinezii). I. Ia. Iakovleva. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 60-64. 12 refs. In Russian.

The function of the nasal vascular system was studied by rhinopneumometry in 10 male subjects during 120 day bed rest in various positions. Some of the subjects were given pituitrin and dioxycorticosterone acetate to support water and mineral metabolism, or nerabol to correct protein metabolism. The blood content in the nasal conchae was generally higher in all subjects on the 3rd through 12th day of hypokinesia, especially in subjects with autonomic and vascular dysfunctions, and the drugs produced no appreciable changes in the nasal blood circulation. The reaction of the nasal vascular system to hypokinesia was generally smaller in subjects given nerabol and was more pronounced in subjects given no drugs.

V.Z.

A71-39230 # Electrical activity of the muscles of the shin during standing after a 120-day bed rest (Elektricheskaya aktivnost' myshts goleni pri stoianii posle 120-sutochnogo postel'nogo rezhima). B. N. Petukhov and Iu. N. Purakhin. *Kosmicheskaya*

Biologiya i Meditsina, vol. 5, May-June 1971, p. 64-69. 17 refs. In Russian.

EMG amplitudes were measured before and after 120-day horizontal hypokinesia in the tibialis and gastrocnemius of a group of 10 healthy subjects who received pituitrin followed by desoxycorticosterone acetate injections. The measurements were made when the subjects were in an upright standing position allowing relaxation or straining of the muscles in alternation. After a one-month recovery period following hypokinesia, the tibialis and gastrocnemius EMG amplitudes increased in most subjects but were still lower than before hypokinesia. V.Z.

A71-39231 # Changes in cardiac ejection caused by 15-day bed rest (Izmenenie serdechnogo vybrosa poa vitaniiem 15-sutochnogo postel'nogo rezhima). B. S. Katkovskii and Iu. D. Pometov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 69-74. 30 refs. In Russian.

Study of the changes in the basic hemodynamic and gaseous metabolism parameters of humans subjected to a strict bed rest regime of moderate duration. A significant increase in cardiac output related mainly to stroke volume was found in five male test subjects during a 15-day bed rest experiment. Oxygen consumption and carbon dioxide production decreased gradually during the observation period. It is suggested that similar changes in cardiac ejection may occur during the early period of weightlessness adaptation in space flight. A.B.K.

A71-39232 # Relation between the elimination of various cations by the kidneys during a disturbance of the salt balance (Sviaz' mezhdu vyvedeniem razlichnykh kationov pochkami v usloviakh narusheniia solevogo balansa). I. S. Balakhovskii, O. A. Virovets, R. K. Kiselev, G. P. Gusev, E. A. Lavrova, and Iu. V. Natchin. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 74-77. 13 refs. In Russian.

Determination of the relation between the elimination of sodium and other ions by the kidneys in humans subjected to a wide range of changes in the state of the water-salt metabolism caused by the prolonged action of high temperature and hypodynamia. It is shown that the nature of the sodium elimination curve depends on the level of input of this element with food intake. In the case of subjects given a diet with a high sodium content, whether subjected to hypodynamia or not, the elimination of sodium in the urine increases severalfold, while the elimination of calcium varies only slightly. In the case of subjects exposed to hypodynamia without excess sodium intake the calcium excretion increased sharply in one subject but remained at a low level in another. It is concluded that the systems of homeostasis regulation of each of the investigated cations differ by high selectivity and reaction specificity. A.B.K.

A71-39233 # Amino silica gels - Regeneratable sorbents for absorbing carbon dioxide, hydrogen sulfide, and water vapor (Aminosilikageli - Regeneriruemye sorbenty dlia pogloshcheniia uglekislogo gaza, serovodoroda i parov vody). I. A. Danilychev, V. V. Strelka, T. N. Burushkina, V. K. Cherkasov, B. L. Avetisants, and V. M. Men'shova. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 77-79. In Russian.

Discussion of some of the sorption characteristics of amino silica gels under static and dynamic conditions. It is shown that the affinity of carbon dioxide for the amino silica gel surface is very high and that the absorption properties of the gel with respect to carbon dioxide remain practically unchanged even after the gel has absorbed a large quantity of water vapor. A high absorption capacity with respect to hydrogen sulfide is also noted, although the affinity of hydrogen sulfide for the amino silica gel surface is less than the affinity of carbon dioxide. The mechanism of interaction between carbon dioxide and amino groups in the surface layer of the gel is explained. A.B.K.

A71-39234 # Nature of the distribution of intraocular pressure in healthy humans from 25 to 40 years old engaged in intellectual work (Kharakter raspredeleniia velichiny vnutriglaznogo davleniia u zdorovykh liudei v vozraste 25-40 let, zanimaiushchikhsia intellektual'nym trudom). T. A. Petrova and M. P. Kuz'min. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 80-82. 18 refs. In Russian.

Analysis of the intraocular pressure distribution curve obtained by daily tonometry for a group of mental workers ranging in age from 25 to 40 years. The distribution curve is found to be fairly symmetrical, with a mode of 21 to 22 mm Hg. An asymmetry in the extreme right-hand portion of the curve is noted (30 mm Hg or more) and is attributed to the presence of an isolated group of subjects whose indices go beyond the limits of the normal distribution. A.B.K.

A71-39235 # Morphological changes in the myocardium under the action of accelerations for several hours (Morfologicheskie izmeneniia miokarda pri mnogochasovom vozdествii uskorenii). P. I. Katunian and V. S. Romanov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 82, 83. In Russian.

Results of histological, histochemical, and electron-microscopic observations of the myocardium reactions in rats subjected to positive 2G accelerations in the z body axis for periods of 8, 16, and 24 hours. Aftereffects were also observed for periods of 24 and 72 hours after stopping the centrifuge. A clearly expressed relationship was observed between the level of dystrophic damage of the myocardium and the duration of acceleration. The structure of the myocardium returned to its normal state by the 72nd hour after termination of acceleration. T.M.

A71-39236 # Optimization of the mineral composition of the nutrient medium for hydrogen bacteria (Optimizatsiia mineral'nogo sostava pitatel'noi sredy dlia vodorodnykh bakterii). V. K. Kovalenkova, L. A. Siletskaia, and V. N. Maksimov. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 84, 85. In Russian.

The method of steepest ascent for mathematical planning of experiments was used to optimize the mineral composition of the nutrient medium for *Hydrogenomonas* bacteria in order to increase the density of the culture and to gain information about the required supplies of mineral salts in spacecraft regeneration systems employing these bacteria. An optimal nutrient medium was chosen by a planned experiment, and its composition is compared in a table with that of the medium proposed by Schlegel et al. (1961). The new medium can yield a density level of the culture equal to that produced by the Schlegel medium with a six times lower overall concentration of salts. T.M.

A71-39237 # Results of the combined action of vibration and gamma irradiation on chlorella (Rezultaty kombinirovannogo vozdествiia vibratsii i gamma-oblucheniia na khlorellu). I. D. Anikeeva and E. V. Moskvitin. *Kosmicheskaya Biologiya i Meditsina*, vol. 5, May-June 1971, p. 85-87. 11 refs. In Russian.

Experimental study of the effects of both combined and separately acting mechanical vibration (100 Hz at an amplitude of 2 mm) and gamma irradiation (200 r) on the sporulation dynamics, survival rate, and mutability of chlorella. The applied modes of vibration, chronic and acute gamma irradiation, and the combined action of vibration and irradiation do not affect the development and mutability of chlorella cells and do not reduce their survival rate. Acute irradiation somewhat increases the survival rate, but this effect is not present in chronic irradiation. T.M.

A71-39238 # One property of the summary characteristics of vestibular nystagmus (Ob odnom svoistve summarnykh kharak-

teristik vestibuliarnogo nistagma). A. A. Shipov. *Kosmicheskaja Biologiya i Meditsina*, vol. 5, May-June 1971, p. 87-89. 10 refs. In Russian.

Experiments with guinea pigs show that the number of strokes and the duration and frequency of nystagmus in animals subjected to successively increasing angular accelerations increase with increasing level of acceleration. The nystagmus reaction to each of the accelerations in the series was smaller than the reaction in animals subjected to a single acceleration of corresponding magnitude. A characteristic feature observed is that the number of strokes and the frequency of nystagmus in response to successively increasing accelerations continued to rise to the maximum level of acceleration while the increase in the duration of nystagmus leveled off relatively quickly. T.M.

A71-39252 Applications of cryogenics to biology and medicine. M. Ashwood-Smith (Victoria, University, Victoria, British Columbia, Canada). In: *Advanced cryogenics*. Edited by C. A. Bailey. London and New York, Plenum Press, 1971, p. 439-454. 10 refs.

Discussion of two application areas of cryobiology: long-term, low-temperature storage of living cells and tissues, and cryosurgery. Blood cell and cattle sperm preservation techniques are briefly reviewed, along with some experimental studies on the preservation of microorganisms and various mammalian tissues and organs. The merits of cryosurgical treatment of malignant growths are also discussed. M.V.E.

A71-39262 # On the instantaneous measurement of blood-flow by ultrasonic means. M. G. J. Arts. Eindhoven, Technische Hogeschool, Master of Science Thesis, 1971. 29 p.

A method is described for estimating average instantaneous blood flow rates over the cross section of a blood vessel from signals of a Doppler flowmeter using continuous ultrasound. Basic in this method is the Doppler effect produced when ultrasound signals transmitted by a crystal collide with the moving erythrocytes of the bloodstream. A mathematical model of this process is set up and its accuracy is evaluated. Block diagrams and circuits of the measuring assembly, including an oscillator, a phase shifter, a differentiator and low pass filter sequences, are given. Test results of the method on steady laminar flows are discussed. V.Z.

A71-39378 Unidirectional rate sensitivity component in local control of vascular tone. V. Smieško (Slovak Academy of Sciences, Institute of Normal and Pathological Physiology, Bratislava, Czechoslovakia). *Pflügers Archiv*, vol. 327, no. 4, 1971, p. 324-336. 28 refs.

Study of vascular responses to brief changes in perfusion pressure, and investigation of the mechanism involved. A one second square wave decrease or increase in perfusion pressure induced active vasodilation in the vascular bed of the gracilis muscle. The agreement of all of the response parameters measured indicates that the mechanism of the vasodilation is independent of the polarity of the pressure change. M.V.E.

A71-39379 K(+), osmolality and subcutaneous adipose tissue blood flow. R. Gregory Sachs, Henry G. Hanley, and N. Sheldon Skinner, Jr. (Emory University, Atlanta, Ga.). *Pflügers Archiv*, vol. 327, no. 4, 1971, p. 337-348. 27 refs. PHS Grant No. HE-12566-02.

The effect of local changes in potassium concentrations and levels of osmolality on vascular resistance in subcutaneous adipose

tissue was studied in 22 dogs. It was found that increases in plasma osmolality produced an inconsistent and slight change in fat pad vascular resistance while an increase in potassium concentration within the physiological range produced consistent but only mild vasodilatation. The results obtained indicate that the potassium ion and the level of plasma osmolality can both cause vascular smooth-muscle relaxation in subcutaneous adipose tissue, and that these two nonspecific factors can also interact to produce even greater vasodilatation. M.V.E.

A71-39440 The effect of chronic hypercapnia on oxygen affinity and 2,3-diphosphoglycerate. Arthur A. Messier and Karl E. Schaefer (U.S. Naval Submarine Medical Research Laboratory, Groton, Conn.). *Respiration Physiology*, vol. 12, Aug. 1971, p. 291-296. 19 refs.

Study of the relationship between oxygen affinity and 2,3-diphosphoglycerate (2,3-DPG) in the red cell in chronic hypercapnia induced by prolonged exposure of guinea pigs to 15% CO₂ and 21% O₂ in N₂. Red cell pH fell to a minimum after six hours of exposure and subsequently rose without reaching initial values after seven days of exposure. Both oxygen half-saturation pressure and the level of 2,3-DPG of the red cells followed the time course of the pH changes. However, both parameters required 24 hours to reach a minimum, following which they increased steadily and were not different from control values after seven days of exposure. (Author)

A71-39441 Pulmonary gas transport characterization by a dynamic model. Gerald M. Saidel, Thomas C. Militano, and Edward H. Chester (Case-Western-Reserve University; U.S. Veterans Administration Hospital, Cleveland, Ohio). *Respiration Physiology*, vol. 12, Aug. 1971, p. 305-328. 30 refs. Research supported by the Ohio Thoracic Society and the Tuberculosis and Respiratory Disease Association of Cleveland.

Development of a mathematical model which describes and predicts pulmonary transport of N₂ and CO. The model is structured as a system of five well-mixed compartments, four of which have variable volumes, arranged in parallel and series. For this structure, the unsteady, mass-balance equations are derived and the effect of parameters is investigated. The model may be used to simulate experiments of nitrogen washout and CO uptake with normal subjects and those with chronic obstructive lung disease (COLD). With each subject, these experiments are conducted at several levels of tidal volume and frequency under controlled conditions. When all experiments of a subject are simulated, a set of parameter values is obtained that characterizes the volume and distensibility distributions in airways and alveoli and the CO mass transport across the pulmonary membrane. M.M.

A71-39442 The effect of oxygen administration on gas exchange and cardiopulmonary function in normal subjects. M. S. Karetzky, J. F. Keighley, and J. C. Mithoefer (Dartmouth College; Mary Hitchcock Memorial Hospital, Hanover, N.H.). *Respiration Physiology*, vol. 12, Aug. 1971, p. 361-370. 27 refs. NIH Grants No. HE-12560-01; No. FR-05392.

Measurement of the effects of six different inspired oxygen concentrations on arterial (14 subjects) and mixed venous (8 subjects) pH, CO₂ partial pressure, and O₂ partial pressure. In all 14 subjects, O₂ uptake, CO₂ uptake, minute ventilation, mean arterial blood pressure, and heart rate were measured at each inspired concentration. Inspired O₂ concentrations between 21 and 40% produced a linear increase in arterial oxygen pressure and content and a progressive small rise in mixed venous oxygen content, with only minimal increase in mixed venous O₂ pressure and without change in O₂ uptake, pH, CO₂ partial pressure, ventilation or cardiac

output. With 100% O₂ the further rise in arterial O₂ partial pressure was accompanied by a significant increase in mixed venous oxygen pressure. The ventilation increased slightly; there was no change in cardiac output or acid-base balance. (Author)

A71-39443 **Stagnant asphyxia in the carotid body of the cat.** D. I. McCloskey and A. M. S. Black (Oxford University, Oxford, England). *Respiration Physiology*, vol. 12, Aug. 1971, p. 381-387. 12 refs.

Stagnant asphyxia was allowed to develop in the carotid body when blood pressure was dropped abruptly to zero by simultaneously clamping the common carotid artery and opening a tap in the external carotid artery to the atmosphere. Discharge in single chemoreceptor fibers was observed as it increased in response to the stagnant asphyxia. When discharge was maximal, blood equilibrated with various gas mixtures was allowed to flow through the bifurcation for different periods of time before again dropping the local blood pressure to zero. After such transient interruptions of stagnant asphyxia with normoxic or hyperoxic blood, the return of stagnant asphyxic discharge was delayed in proportion to the degree and duration of preceding hyperoxia - i.e., the organ established an 'oxygen credit.' It is suggested that the carotid body may have a capacity to store oxygen. (Author)

A71-39474 **International Institute for Interdisciplinary Cycle Research, International Interdisciplinary Cycle Research Symposium, 2nd, Noordwijk, Netherlands, June 14-19, 1970, Proceedings. Parts 1 & 2.** Symposium supported by the Foundation for the Study of Cycles. *Journal of Interdisciplinary Cycle Research*, vol. 2, June; Aug. 1971. Pt. 1, 168 p.; pt. 2, 106 p.

The reports are classified, first, in terms of biological cycles in biochemical systems, at the cellular level, in living organisms, and in population groups. Among the subjects treated are cyclic phenomena in biological and biochemical systems, and possible diversity in basic mechanisms of biological oscillations. Under the classification of physiological cycles general, hormonal, and urinary cycles are considered, e.g., circadian rhythms of renal excretion in human subjects at different latitudes. The reports in part 2 belong to the categories of veterinary, medical, and geophysical cycles (meteorological and astronomical), and cycle synchronies and statistics. Attention is given to the biological effects of extremely low frequency electrical phenomena in the atmosphere, the study of the rotation of the earth, and a vectorial representation of time series data.

F.R.L.

A71-39475 **Cyclic phenomena in biological and biochemical systems.** A. Betz and L. von Klitzing (Bonn, Universität, Bonn, West Germany). (*International Institute for Interdisciplinary Cycle Research, International Interdisciplinary Cycle Research Symposium, 2nd, Noordwijk, Netherlands, June 14-19, 1970.*) *Journal of Interdisciplinary Cycle Research*, vol. 2, June 1971, p. 111-120. 15 refs.

Consideration of cyclic phenomena, which are important for processes such as the coordination in development, locomotion of organisms, biological transport, and information exchange. In all these cases a rhythmic process describes and stabilizes a sequence of reactions well ordered with respect to time. In circadian rhythms the organisms are able to develop highly sophisticated timing systems, extremely well stabilized against fluctuations in temperature. As a working hypothesis it is assumed that the physiological basis of biological rhythms is a group of biochemical oscillators - i.e., an oscillatory biochemical feedback system.

F.R.L.

A71-39476 **Possible diversity in basic mechanisms of biological oscillations.** Thérèse Vanden Driessche (Bruxelles, Université Libre, Brussels, Belgium). (*International Institute for Interdisciplinary Cycle Research, International Interdisciplinary Cycle Research Symposium, 2nd, Noordwijk, Netherlands, June 14-19, 1970.*) *Journal of Interdisciplinary Cycle Research*, vol. 2, June 1971, p. 133-145. 63 refs.

Study of the molecular nature of the basic mechanism of circadian oscillations. The experimental evidence gained about the basic oscillating system is quite small, and can be summarized by the high probability of implication of nucleic acids in the basic mechanism itself. Four arguments support this assumption: a time-keeping device is part of the genetic characters of the species; the striking effects of UV irradiation on rhythmicity; the effects of actinomycin D on several rhythms indicate a probable role for RNA; and modifications presumably attributable to variations in RNA concentrations bring about parallel modifications in the circadian rhythms.

F.R.L.

A71-39477 **Circadian rhythms of renal excretion in human subjects at different latitudes.** Mary C. Lobban (Medical Research Council, National Institute for Medical Research, London, England). (*International Institute for Interdisciplinary Cycle Research, International Interdisciplinary Cycle Research Symposium, 2nd, Noordwijk, Netherlands, June 14-19, 1970.*) *Journal of Interdisciplinary Cycle Research*, vol. 2, June 1971, p. 273-281. 16 refs.

Attempt to detect differences in the physiological circadian rhythms of indigenous human subjects from polar, temperate, and equatorial regions. Some miscellaneous observations on the human circadian rhythms of renal excretions are drawn together which lend support to this idea. Differences were observed between the renal excretions which may be brought about by variations in the daily light day/dark night (L/D) environment.

F.R.L.

A71-39478 **Biological effects of extremely low frequency electrical phenomena in the atmosphere.** H. König (München, Technische Hochschule, Munich, West Germany). (*International Institute for Interdisciplinary Cycle Research, International Interdisciplinary Cycle Research Symposium, 2nd, Noordwijk, Netherlands, June 14-19, 1970.*) *Journal of Interdisciplinary Cycle Research*, vol. 2, Aug. 1971, p. 317-323. 8 refs.

Demonstration that electrical fields similar to those which exist in nature can cause medical, zoological, and biological effects. In humans it is shown that the signal type of the alpha and gamma rhythm of the EEG comes very close in frequency and wave shape to the natural e.l.f. field and also to the artificial electric fields used for experiments. Zoological and biological effects have been observed on peach-leaf lice, lactic-acid bacteria, bear yeast, and plant life.

F.R.L.

A71-39480 * **The summation-dial, a vectorial representation of time series data.** N. W. Hetherington, C. M. Winget, L. S. Rosenblatt (NASA, Ames Research Center, Physiology Branch, Moffett Field, Calif.), and P. B. Mack (Texas Woman's University, Denton, Tex.). (*International Institute for Interdisciplinary Cycle Research, International Interdisciplinary Cycle Research Symposium, 2nd, Noordwijk, Netherlands, June 14-19, 1970.*) *Journal of Interdisciplinary Cycle Research*, vol. 2, Aug. 1971, p. 365-377.

Development of mathematical methods which would be applicable to data both stationary and nonstationary in time. The basic method suggested has been utilized for many years in the study of geomagnetism, and is here extended to the study of the interrelationships between two rhythms. These methods are described, and examples derived from a study involving 8 male human subjects who had undergone 56 days of bed rest, following a 6-day ambulatory or control period, are cited.

F.R.L.

A71-39545 **Automatizing of visual attention.** Charles J. Furst (Langley Porter Neuropsychiatric Institute, San Francisco, Calif.). *Perception and Psychophysics*, vol. 10, Aug. 1971, p. 65-70. 20 refs.

Description of an experiment in which human subjects observed stimulus pictures for several trials, during which records were made of their visual fixations. It was found that fixation rate habituated and that this habituation was accompanied by a reduction in the uncertainty (entropy) of the spatial distributions of fixations. These results were interpreted as evidence for automatizing visual fixation processes. Analysis of eye-movement distances suggested a possible mechanism for the reported loss of vividness of a stimulus which is perceived habitually. M.M.

A71-39548 **Learning of cardiovascular responses - A review and a description of physiological and biochemical consequences.** Leo V. DiCara (Rockefeller University, New York, N.Y.). *New York Academy of Sciences, Transactions, Series 2*, vol. 33, Apr. 1971, p. 411-422. 58 refs. Research supported by the American Heart Association; PHS Grants No. MH-19172; No. MH-13189; No. GM-34110.

Results obtained by various investigators are noted which indicate that instrumental learning of visceral responses can be used for therapeutic purposes. By proving that autonomic responses are subject to instrumental learning and that the learning of visceral responses has significant behavioral, physiological, and biochemical consequences, work in this new area is of significance for learning theory and for the etiology and therapy of psychosomatic symptoms. V.P.

A71-39605 **Effect of conditions of space flight on station 'Zond-5' on seeds, onions, and tradescantia plants.** N. L. Delone, E. M. Morozova, and V. V. Antipov. (*Kosmicheskie Issledovaniia*, vol. 9, Jan.-Feb. 1971, p. 156-159.) *Cosmic Research*, vol. 9, Jan.-Feb. 1971, p. 146-148. Translation.

Effects of Zond 5 circumlunar flight on spiderwort (*Tradescantia paludosa*) plants, onion bulbs, and dry seeds of wheat, barley, peas, carrots, tomatoes, mustard, and pine. The germinating capacity was higher for pea seeds subjected to space flight than for control seeds. Growth stimulation was observed in onion bulbs, and the percentage of chromosome rearrangements increased for barley and pine seeds. Spiderwort roots did not exhibit a statistically reliable increase of chromosome rearrangements. T.M.

A71-39767 * # **Cortical responses of awake cat to narrow-band FM noise stimuli.** Edmund M. Glaser (Maryland, University, Baltimore, Md.). *Acoustical Society of America, Journal*, vol. 50, Aug. 1971, pt. 2, p. 490-501. 23 refs. PHS-NASA-supported research.

Unanesthetized cats with chronically implanted epidural electrodes in the region of primary auditory cortex were stimulated with frequency-modulated (FM) noises of varying bandwidths. The average evoked responses to these stimuli were compared with responses to tone bursts of the same center frequency and intensity. Two different noise stimuli were used: (1) bursts with rise/fall times the same as the tone burst; (2) transitions from tone to noise and back with transition times equal to tone-burst rise time. It was found that: (1) the magnitude of the early response components increases with the bandwidth of the modulating noise, the relationship being fitted well by a power function; (2) there is a smaller power-law type of increase in response amplitude with rms rate, noise bandwidth being held constant; (3) responses to transitions from tone to noise were quite marked, often exceeding burst responses, while responses to transitions from noise to tone were only rarely observed. These results are discussed in terms of the activity of single units in auditory cortex. A simple neuronal model is proposed to explain and

unify the findings. The results are also compared with psychological loudness summation studies. (Author)

A71-39768 * # **Intracochlear potential recorded with micropipets. I - Correlations with micropipet location. II - Responses in the cochlear scalae to tones. III - Relation of cochlear microphonic potential to stapes velocity.** H. S. Sohmer (Massachusetts Eye and Ear Infirmary, Boston, Mass.), W. T. Peake, and T. F. Weiss (MIT, Cambridge; Massachusetts Eye and Ear Infirmary, Boston, Mass.). *Acoustical Society of America, Journal*, vol. 50, Aug. 1971, pt. 2, p. 572-615. 96 refs. Research supported by the Joint Services Electronics Program, PHS, and NASA.

KCl-filled glass micropipets were inserted through the round window of anesthetized cats to determine the dc potential, and the magnitude and phase of responses during the advancement of the micropipet through the cochlea. The fluid in each scala was equipotential in a transverse plane for both ac and dc potentials, and the level and phase of responses to tones changed when large positive dc potentials occurred. No evidence was found for the existence of an extracellular negative dc potential in the organ of Corti. The responses obtained from cochleas with severed auditory nerves were similar to those from intact cochleas. The potentials in the scala media and the scala vestibuli were found to be in phase, but were substantially higher in the scala media than in the scala vestibuli. It was also found that the cochlear potential response was proportional to the stimulus over a broad range of frequencies when the stimulus level was relatively low. V.Z.

A71-39769 # **Estimate of the inherent channel capacity of the ear.** Edith L. R. Corliss (National Bureau of Standards, Institute for Basic Standards, Washington, D.C.). *Acoustical Society of America, Journal*, vol. 50, Aug. 1971, pt. 2, p. 671-677. 22 refs.

The application of Shannon's equations for binary signal transmission (1949) to the computation of an inherent channel capacity of the ear from its circuit parameters is discussed. The properties of a model proposed by Corliss (1967) to derive a unit of hearing response in the form of an effective least count are analyzed. Curves are plotted to compare the intelligibility scores computed from the bit capacity of the ear and the phoneme rate of speech with experimental observations. Curves are also plotted for theoretical functions characterizing the properties of the ear as a communication channel. These functions include effective internal SNR of the ear, the fraction of channel capacity taken up by confusion (equivocation), and the inherent limiting time interval required for the ear to make a binary decision. Aspects of speech as an information source are also discussed. V.Z.

A71-39770 # **Mechanism of absorption of ultrasound in liver tissue.** H. Pauly and H. P. Schwan (Pennsylvania, University, Philadelphia, Pa.). *Acoustical Society of America, Journal*, vol. 50, Aug. 1971, pt. 2, p. 692-699. 19 refs. NIH Grant No. RO1 HE-01253; Contract No. AF 33(616)-2494.

The dominant part of the acoustic absorption of liver tissue and its components results from macromolecular relaxation processes. The absorption has been investigated over the frequency range 1 to 10 MHz and the following results have been obtained: (1) about two-thirds of the total absorption arises at the macromolecular level, with the remainder caused by macroscopic structure, (2) the specific absorption of tissue macromolecules, as expressed in absorption per weight percent, varies considerably from one biopolymer to another, (3) the absorption is related to the structure of the biological macromolecule or its hydration and changes with heat denaturation and pH, and (4) a similar frequency dependence results for all materials investigated. This dependence is to be expected if one assumes that the molecular processes of absorption are characterized by a broad spectrum of relaxational time constants and activation energies extending over a range of at least 1:7. (Author)

A71-39874 * **The effects of noise on man.** K. D. Kryter (Stanford Research Institute, Menlo Park, Calif.). Research supported by the U.S. Army, the National Institutes of Health, and NASA. New York, Academic Press, Inc., 1970. 640 p. 914 refs. \$19.50.

This book represents an attempt to provide a critical and historical (dating from 1950) analysis of the relevant literature in the field and, as warranted, to derive new or modify existing techniques for the evaluation of environmental noise in terms of its effects on man. Fundamental definitions of sound, its measurement, and concepts of the basic functioning and attributes of the auditory system are provided. The discussion of man's nonauditory system responses includes information about the effects of noise on such things as work performance, sleep, feelings of pain, vision, and blood circulation. Some of the more complex effects of noise have to do with these somewhat second-order reactions. G.R.

A71-39958 **Stereoscopic vision in the cat.** Robert Fox and R. Randolph Blake (Vanderbilt University, Nashville, Tenn.). *Nature*, vol. 233, Sept. 3, 1971, p. 55, 56. 17 refs. PHS-supported research.

Stereoscopic depth discrimination was tested for seven consecutive days in experiments on cats to study their stereoscopic vision. The cats were trained to emit a frequent response to stimuli and inhibit their responses to a stimulus indicating a forthcoming noxious event appearing in near and far positions. Rods enclosed in a viewing tunnel, or rod-like shadows were used as stimuli. It is concluded that cats have stereopsis and are able to use it in making a conditioned suppression discrimination in response to stereostimuli. V.Z.

STAR ENTRIES

N71-31601* Minnesota Univ., Minneapolis. Div. of Environmental Health.

ENVIRONMENTAL MICROBIOLOGY AS RELATED TO PLANETARY QUARANTINE Semiannual Progress Report, 1 Jun. 1970-30 Nov. 1970

Irving J. Pflug Dec. 1970 59 p refs
(Grant NGL-24-005-160)

(NASA-CR-119638; SAPR-5) Avail: NTIS CSCL 06M

The relationship between environmental microbiology and planetary quarantine is discussed. Subjects presented are: (1) survival of microbial spores under several temperature and humidity conditions, (2) detection of low levels of microbial contamination of surfaces by chemical approaches, (3) dry heat destruction rates of microorganisms on surfaces. P.N.F.

N71-31608* Welson (B.) and Co., Inc., Hartford, Conn.

DEVELOPMENT OF LUNAR SAMPLE PROCESSING GLOVES FOR THE LUNAR RECEIVING LABORATORY Final Report

24 Jun. 1971 55 p
(Contract NAS9-11626)

(NASA-CR-115112) Avail: NTIS CSCL 06Q

The feasibility was established of developing a pair of all viton gloves for use in the sterile nitrogen atmospheric processing cabinet of the Lunar Receiving Laboratory. All aspects, from material formulation to finished product packaging, are documented together with discussions of in-house experimentation activities. Author

N71-31610# School of Aerospace Medicine, Brooks AFB, Tex. Div. of Physiology.

DETERMINATION OF ALPHA-TOCOPHEROL IN FREEZE DRIED FOODS BY A MODIFIED COLORIMETRIC PROCEDURE Final Report, 1 Oct. 1969-30 Apr. 1970

Emmett J. Stork and Ramiro P. Villanueva Sep. 1970 11 p refs

(AD-713829; SAM-TR-70-61) Avail: NTIS CSCL 07C

A reliably precise and reproducible determination of alpha-tocopherol was achieved by an adaptation of the classic colorimetric determination of alpha-tocopherol. The method was preceded by the separation of the various tocopherols either by secondary magnesium phosphate column chromatography or by Florisil column chromatography. The basic method, despite its disadvantages, was considered the most suitable method for use with oils, foods, and feeding stuffs. Samples of precooked, freeze-dried ground beef, chicken cubes, whole eggs, corn, beans, and peas were analyzed and alpha-tocopherol values consistent with those reported in the literature were obtained. Recovery values achieved with the addition of pure alpha-tocopherol ranged from a minimum recovery of 90.2% to a maximum recovery of 99.1%. Author

N71-31612# School of Aerospace Medicine, Brooks AFB, Tex. Biometrics Div.

AUTOMATIC DETECTION AND DISPLAY OF ARRHYTHMIAS ON A DESK-TOP ANALOG COMPUTER Final Report, Oct. 1968-Oct. 1969

Edward J. Engelken Jun. 1970 8 p refs

(AD-711039; SAM-TR-70-34) Avail: NTIS CSCL 06B

A previously discussed technic for the automatic detection and display of arrhythmias was improved and programmed on an EAI TR-20 desk-top analog computer. A complete program description, diagram, and parts list is provided to enable the duplication of the program with minimum effort. Author

N71-31613# School of Aerospace Medicine, Brooks AFB, Tex. Otolaryngology Branch.

NOISE WITHIN THE BELL UH-1P HELICOPTER DURING FLIGHT Final Report, Apr.-Jun. 1970

Donald C. Gasaway Sep. 1970 11 p refs

(AD-713830; SAM-TR-70-57) Avail: NTIS CSCL 20A

Measurements are reported for acoustic noise encountered within a Bell UH-1P helicopter during a ground-attack mission. Auditory effects of rocket and gun (7.62 mm minigun) firing are described and illustrated. Factors of aeromedical importance are identified and described. Author

N71-31614# School of Aerospace Medicine, Brook AFB, Tex. Biomedical Engineering Branch.

DETERMINING RESPIRATORY RATE AND VOLUME FROM ECG R-WAVE AMPLITUDE MODULATION Final Report, 1970

Bryan L. Steadman Sep. 1970 11 p refs

(AD-713833; SAM-TR-70-65) Avail: NTIS CSCL 06B

Various ECG electrode placements were investigated to determine which location would yield an R-wave amplitude modulation with the highest possible degree of correlation to respiratory volume. Each subject breathed into a spirometer to generate an electrical signal proportional to instantaneous respiratory volume. This signal was simultaneously recorded with the various electrocardiographic signals sensed by the electrodes attached to the subject. This information was then digitized and a plot of R-wave amplitude versus respiratory volume was made and the coefficient of correlation was computed for each set of data. Author

N71-31616# Naval Aerospace Medical Inst., Pensacola, Fla. Bureau of Medicine and Surgery.

LIVING HUMAN DYNAMIC RESPONSE TO - G SUB X IMPACT ACCELERATION. 2: ACCELERATIONS MEASURED ON THE HEAD AND NECK

C. L. Ewing, D. J. Thomas (Harvard School of Public Health), L. M. Patrick (Wayne State Univ.), G. W. Beeler (Mayo Clinic), and M. J. Smith Repr. from 13th Stapp Car Crash Conf., 1969 Oct. 1970 18 p refs Prepared in cooperation with the Army Aeromedical Research Lab., Fort Rucker, Ala.

(AD-717130; NAMRL-1122; USAARL-71-11) Avail: NTIS CSCL 06S

A methodical investigation and measurement of human dynamic response to impact acceleration is presented. Linear accelerations are being measured on the top of the head, at the mouth, and at the base of the neck. Angular velocity is also being measured at the base of the neck and at the mouth. A redundant photographic system is being used for validation. All data are collected in computer compatible format and data processing is by digital computer. Selected data in a stage of interim analysis on

18 representative human runs of the 236 humans runs completed to date are presented. Review of the data indicates that peak accelerations measured at the mouth are higher than previous estimates. The time relationship of the peak resultant mouth accelerations to the peak sled acceleration for this particular accelerator and restraint system is described. The maximum peak resultant mouth acceleration was 47.8 g and the peak mouth angular velocity on another run exceeded 30 rad/sec, on nominal 10 g, 250 g/sec runs. Clinical evaluation of the subjects before and after the runs disclosed no evidence of unconsciousness or neurological deficit attributable to the acceleration. Author

N71-31617# Aberdeen Research and Development Center, Aberdeen Proving Ground, Md. Human Engineering Labs.

MILESTONES: A DIRECTORY OF HUMAN ENGINEERING LABORATORIES PUBLICATIONS, 1953-1970

Jan. 1971 128 p

Avail: NTIS

An updated directory of MILESTONES is presented which provides information on research conducted in Human Engineering Laboratories. Subject categories include aircraft, audition, environment, information processing, vehicles, vision, weapons, and related subjects. E.M.C.

N71-31618*# Naval Aerospace Medical Inst., Pensacola, Fla.
LIGHTING FACTORS AFFECTING THE VISIBILITY OF A MOVING DISPLAY

Richard D. Gilson and Robert H. Elliott 7 Aug. 1970 12 p refs Prepared in cooperation with the Army Aeromedical Res. Lab., Fort Rucker, Ala.

(NASA Order L-43518)

(NASA-CR-119640; AD-715625; NAMRL-1113; USAARL-71-4)

Avail: NTIS CSCL 05E

Compensatory tracking performance was shown to be substantially degraded by oscillation of the visual display at both 1.0 Hz and 2.0 Hz. The severity of this decrement was significantly altered by changes in both the color and the intensity of the display illumination. Performance was significantly better with red light illuminating the display at 0.05 mL than with blue light at the equivalent luminance. This improvement in performance was similar in magnitude to that found for an increase in broadband illumination of the display where luminance was increased from one-half log unit below to one-half log unit above 0.05 mL. Visual mechanisms that may have been responsible for these findings are suggested and practical considerations of instrument lighting are discussed. Author

N71-31620# Naval Aerospace Medical Inst., Pensacola, Fla. Bureau of Medicine and Surgery.

THE APPLICATION OF COLLEGE AND FLIGHT BACKGROUND QUESTIONNAIRES AS SUPPLEMENTARY NONCOGNITIVE MEASURES FOR USE IN THE SELECTION OF STUDENT NAVAL AVIATORS

Ronald M. Bale and Rosalie K. Ambler 6 Oct. 1970 16 p refs

(AD-717941; NAMRL-1120) Avail: NTIS CSCL 05I

A multiple correlation approach was utilized to demonstrate that the inclusion of noncognitive college and flight background information would enhance the sensitivity of selection processes, thus reducing the attrition rate of student naval aviators. The initial results confirmed the hypothesis and the findings were upheld by crossvalidation. Implementation of the suggested technique would

have reduced the attrition rate by 4.5 percentage points for the cross-validation sample. It is recommended that the technique be incorporated as a management tool at the primary selection level.

Author

N71-31621# Naval Aerospace Medical Inst., Pensacola, Fla. Bureau of Medicine and Surgery.

REPLACEMENT AIR GROUP PERFORMANCE AS A CRITERION FOR NAVAL AVIATION TRAINING

Ronald M. Bale, George M. Rickus, Jr. and Rosalie K. Ambler 8 Dec. 1970 11 p refs

(AD-718848; NAMRL-1126) Avail: NTIS CSCL 05I

A multiple correlation analysis was used to examine the possibility of utilizing replacement air group completion as an advanced criterion variable for student naval aviator performance prediction and probability estimation of student completion of flight training. Undergraduate training grades were found to significantly predict replacement air group completion. The findings were crossvalidated on an equivalent sample. Had the proposed weighting system been employed, the attrition rate of the cross-validation sample would have been reduced by 33.8 percent. Author

N71-31622# School of Aerospace Medicine, Brooks AFB, Tex. Biomedical Engineering Branch.

ELECTROCARDIOGRAM R-WAVE AMPLITUDE DETECTOR
Technical Report, Oct. 1968-Apr. 1970

Bryan L. Steadman Sep. 1970 11 p

(AD-712668; SAM-TR-70-60) Avail: NTIS CSCL 06B

A device is described that accepts a raw electrocardiographic signal as an input and generates a steplike output where the height of each step represents the amplitude of each R-wave on a beat-by-beat basis. The instrument is designed to accept an input peak-to-peak signal of 0.5 mV to 5.0 V, enabling it to accept most of the commonly available signal levels. An adjustable dc offset and optional ac coupling circuit are available in the output stage of the device to facilitate the study of the beat-by-beat change in R-wave amplitude. Author

N71-31625# Human Resources Research Organization, Alexandria, Va. Div. No. 5.

AIRCRAFT RECOGNITION PERFORMANCE OF CREW CHIEFS WITH AND WITHOUT FORWARD OBSERVERS

Robert D. Baldwin, Edward W. Frederickson, and Edward C. Hackerson Aug. 1970 43 p refs

(Contract DAHC19-70-C-0012)

(AD-714213; HumRRRO-TR-70-12) Avail: NTIS CSCL 05I

A test of aircraft recognition accuracy and decision speed compared the performance of single observers and four man crews. The test used miniaturized simulations of aircraft which were moved at scaled speeds, altitudes, and distances. The validity of the simulation was evaluated, and judged acceptable, by comparing the results of the miniaturized test with results obtained from a previous full-scale test. Comparison of single observers with crews revealed that approximately 50 percent of the observers performed more effectively when alone than when with a crew, in terms of both accuracy and decision speed. The remaining observers performed either equally well, or more effectively when with a crew than when alone. These two groups of effective crew observers tended to be less dependent upon other crewmen judgments than the less effective crew observers. E.M.C.

N71-31660# Southampton Univ. (England). Inst. of Sound and Vibration Research.

PILOT VISUAL ACUITY DURING HELICOPTER FLIGHT

M. J. Griffin Feb. 1971 43 p refs Sponsored by Min. of Defence

(ISVR-TR-44) Avail: NTIS

An experiment to determine pilot visual acuity during helicopter flight is described. The visual task consisted of detecting black wire-shaped objects against uniformly illuminated backgrounds. Experimented results indicate that there is an acuity decrement when viewing the test objects under certain conditions during helicopter flight. Acuity during flight was significantly worse than when standing on the ground for black visual test objects presented against a dark grey background. There was no significant difference between the two scores when the same black test objects were presented against a white background. The implications of these results are discussed and recommendations for further work are presented.

Author (ESRO)

N71-31733# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

SPONTANEOUS CARDIAC ARRHYTHMIAS INDUCED BY BROMOTRIFLUOROMETHANE

Ethard W. Van Stee and Kenneth C. Back Feb. 1971 19 p refs

(AD-723645; AMRL-TR-68-188) Avail: NTIS CSCL 6/5

Cardiac arrhythmias spontaneously appearing in monkeys exposed to CBrF₃ were found to require a minimal blood pressure threshold for their production. The blood pressure threshold varied as an inverse function of the log₁₀ of the CBrF₃ concentration to which monkeys in acid-base balance were exposed. Acidosis decreased the threshold and alkalosis increased the threshold at concentrations of 10 and 20 percent CBrF₃ but were without effect at 30 percent or greater concentrations. Epinephrine was found to decrease the blood pressure threshold required to trigger arrhythmias but was not necessary for their production as it is in the case of cyclopropane. The difference in individual susceptibility to the spontaneous formation of arrhythmias during exposure to CBrF₃ reported by Van Stee and Back (1969) was found to be the result of differences in individual ability to maintain blood pressure during CBrF₃ exposure.

Author (GRA)

N71-31741# Air Force Human Resources Lab., Williams AFB, Ariz. Flying Training Div.

IMPROVED CREW MEMBER TRAINING THROUGH A NEW PHILOSOPHY TOWARD TRAINING

Milton E. Wood Aug. 1970 12 p refs

(AD-723313; AFHRL-TR-70-31) Avail: NTIS CSCL 5/9

New emphasis on the total learning process is bringing about significant changes in both the educational and training communities. The process-oriented, systems approach to training integrates behavioral objectives, media, and instructors in such a way that increased training effectiveness is realized through a greater ability to deal with the learning requirements of the individual student. Based on current United States Air Force efforts to employ and evaluate this general approach to training, new efficiencies in instruction are indicated. This system will provide a basis for defining the characteristics of future UPT multi-media systems. The basic principles inherent in the new-look in training appears to be generally applicable to all phases of crew-member training.

Author (GRA)

N71-31768# Naval Aerospace Medical Inst., Pensacola, Fla. Research Lab.

EVIDENCE FOR A TEST OF DYNAMIC OTOLITH FUNCTION CONSIDERED IN RELATION TO RESPONSES FROM A PATIENT WITH IDIOPATHIC PROGRESSIVE**VESTIBULAR DEGENERATION**

Ashton, Graybiel, Charles W. Stockwell, and Fred E. Guedry, Jr. 1 Oct. 1970 10 p refs

(AD-722318; NAMRL-1119; NAVMED-MR005.01.01.1208-4)

Avail: NTIS CSCL 6/19

A patient is described who possessed residual otolith function, but whose loss of canal function was complete for the horizontal and nearly complete for the vertical canals. A clear (but abnormal) nystagmus response was elicited during rotation about an Earth-horizontal axis, confirming the conclusion, based on animal experiments, that this response depends upon the otolith system. This test appears to measure dynamic otolith function and therefore provides a useful supplement to other vestibular tests.

Author (GRA)

N71-31888# Vereinigte Flugtechnische Werke-Fokker G.m.b.H., Bremen (West Germany).

ON THE QUESTION OF PILOT INJURY DURING LOW ALTITUDE FLIGHT [ZU FRAGEN DER PILOTENSCHAEDIGUNG BEIM TIEFFLUG]

P. Schulz In DGLR Turbulence Model at Low Altitudes and Flight in a Turbulent Atmosphere Dec. 1970 p 99-117 refs In GERMAN

Avail: NTIS; ZLDI Munich: 34 DM

The calculation of pilot injuries during low altitude high speed flight is presented. The pilot acceleration loads due to gusts and low level turbulence are calculated for stochastic disturbances, and the transfer function of the aircraft is taken into account.

ESRO

N71-31942# Naval Aerospace Medical Inst., Pensacola, Fla.

SELECTED BIVARIATE ANTHROPOMETRIC DISTRIBUTIONS DESCRIBING A SAMPLE OF NAVAL AVIATORS, 1964

William F. Moroney 10 Mar. 1971 39 p refs

(AD-723796; NAMRL-1130; NAVMED-MF12.524.002-5013D)

Avail: NTIS CSCL 5/5

Previous anthropometric surveys presented means, standard deviations, ranges, and percentiles as descriptors of the anthropometric features of aviator populations. These reports were limited to a consideration of each variable independently. However, designers also need knowledge of the interaction between variables in order to determine what proportion of the potential operator population their design decisions will eliminate. This report extends data previously collected from 1549 naval aviation personnel by presenting bivariate tables that illustrate the relationship between selected variables. Twenty-one tables were prepared which contained selected interactions between the following variables: bidentoid diameter; buttock-knee length; eye height, sitting; functional reach; head height; knee height, sitting; sitting height; shoulder height, sitting; standing height; and thigh circumference. Means, standard deviations, ranges, regression equations, standard error of estimate, and percentile levels were also presented for each variable.

Author (GRA)

N71-32009# Joint Publications Research Service, Washington, D.C.

AUDITORY PATTERN RECOGNITION

N. G. Zagoruyko, ed., et al 15 Jul. 1971 40 p refs Transl. into ENGLISH from the book 'Raspoznavaniye Slukhovyykh Obrazov' Novosibirsk, Nauka Press, 11 Feb. 1969

(JPRS-53606) Avail: NTIS

CONTENTS:

1. STRUCTURE OF THE AUDITORY PATTERN RECOGNITION PROBLEM AND METHODS OF SOLVING IT p 1-16 refs
2. METHODS OF VOICE SIGNAL DESCRIPTION AND RECOGNITION p 17-38 refs

N71-32010# Joint Publications Research Service, Washington, D.C.

STRUCTURE OF THE AUDITORY PATTERN RECOGNITION PROBLEM AND METHODS OF SOLVING IT

In its Auditory Pattern Recognition 15 Jul. 1971 p 1-16 refs

Avail: NTIS

The problems and methods to solve automatic auditory pattern recognition are discussed. An extensive bibliography is included. E.H.W.

N71-32011# Joint Publications Research Service, Washington, D.C.

METHODS OF VOICE SIGNAL DESCRIPTION AND RECOGNITION

In its Auditory Pattern Recognition 15 Jul. 1971 p 17-38 refs

Avail: NTIS

The use of analog to digital converters in voice signal analysis to reduce cost and search operation time is discussed. The requirements imposed on the input devices and the parameters of existing converters are given. An extensive bibliography is included. E.H.W.

N71-32012# Joint Publications Research Service, Washington, D.C.

VISUAL, MEMORY AND BIONIC MODELS' ROLE ANALYZED

21 Jul. 1971 34 p refs Transl. into ENGLISH from Probl. Bioniki, Resp. Mezhdudv. Nauchn.-Tekhn. Sb. (Kharkov), no. 2, 1970 p 31-32 and 68-87 (JPRS-53647) Avail: NTIS

CONTENTS:

1. CERTAIN GENERALIZATIONS IN A MATHEMATICAL MODEL OF VISION G. S. Grushko p 1-3 ref
2. REGISTERING STRUCTURE AS A MEMORY MODEL AND ITS ROLE IN PERCEPTION PROCESSES E. V. Uteush p 4-23 refs
3. CONCERNING A PROMISING TREND IN COMPUTER TECHNOLOGY V. P. Belyavskiy et al p 24-32 refs

N71-32013# Joint Publications Research Service, Washington, D.C.

CERTAIN GENERALIZATIONS IN A MATHEMATICAL MODEL OF VISION

G. S. Grushko *In its* Visual, Memory and Bionic Models' Role Analyzed 21 Jul. 1971 p 1-3 ref

Avail: NTIS

Mathematical models are presented to describe the vision process. Numerical relationships of brilliance of the optical pattern, brilliance of visual sensation, coefficient of visual inertia, and coefficient of sighting irradiation are established. P.N.F.

N71-32014# Joint Publications Research Service, Washington, D.C.

REGISTERING STRUCTURE AS A MEMORY MODEL AND ITS ROLE IN PRECEPTION PROCESSES

E. V. Uteush *In its* Visual, Memory and Bionic Models' Role Analyzed 21 Jul. 1971 p 4-23 refs

Avail: NTIS

The problem of the structure of memory is discussed. The processes of information storage in the memory and the control over the recording of information are examined. Hydraulic and electric analogies are established and numerical models of the memory process are presented. P.N.F.

N71-32032# Joint Publications Research Service, Washington, D.C.

NEURON SIMULATION AND SCANNING SYSTEMS OUTLINED

14 Jul. 1971 20 p refs Transl. into ENGLISH from Sovrem. Probl. Kibernetiki (Moscow), 262-267, 376-382 (JPRS-53597) Avail: NTIS

CONTENTS:

1. MODELLING THE ADAPTATION OF A NEURON AND SPONTANEOUS ACTIVITY OF NEURON NET A. S. Kolokolov et al p 1-8 refs
2. ON A SYNTHESIS OF SEARCH TYPE SCANNING SYSTEMS S. Y. Zdor p 9-18 refs

N71-32033# Joint Publications Research Service, Washington, D.C.

MODELLING THE ADAPTATION OF A NEURON AND SPONTANEOUS ACTIVITY OF NEURON NET

A. S. Kolokolov et al *In its* Neuron Simulation and Scanning Systems Outlined 14 Jul. 1971 p 1-8 refs

Avail: NTIS

Methods of constructing a neuron adaptation model and simulating the spontaneous activity of a neuron network are described. Neuron adaptation involves a reduction in the frequency time of pulses being generated, a concept applicable to a biological neuron which cannot be held in an indefinite excited state due to limited internal energy resources. As an elementary cell of a nerve network, use is made of an analog model containing a blocking generator with controllable frequency. Simulation of the neuron adaptation is then discussed, as well as development of a simple neuron multivibrator. Finally, expansion of this multivibrator into a switching neuron network with a controlled rate of transmitting the excitation is treated. A.C.R.

N71-32034# Joint Publications Research Service, Washington, D.C.

ON A SYNTHESIS OF SEARCH TYPE SCANNING SYSTEMS

S. Ye. Zdor *In its* Neuron Simulation and Scanning Systems Outlined 14 Jul. 1970 p 9-18 refs

Avail: NTIS

Synthesis of search scanning systems is discussed, emphasizing the primary variables that must be considered in formulating optimal distribution of search efforts. It appears that optimal scanning efficiency is directly related to a special filament optical image converter. A mathematical procedure for developing the basic specifications for such a converter is described. A.C.R.

N71-32079# Federal Aviation Administration, Oklahoma City, Okla. Civil Aeromedical Inst.

ALCOHOL AND DISORIENTATION RELATED RESPONSES. 1: NYSTAGMUS AND VERTIGO DURING CALORIC AND OPTOKINETIC STIMULATION

David J. Schroeder Feb. 1971 30 p refs
(FAA-AM-71-6) Avail: NTIS

The effects of two levels of alcohol on the vertigo and nystagmic responses resulting from caloric irrigations with visual conditions and the alertness of the subjects carefully controlled are reported. Additional information concerning the effects of alcohol on optokinetic nystagmus was also obtained. The data clearly indicate that alcohol suppresses the nystagmic response to caloricizations in total darkness. However, under conditions where visual fixation is permitted and where visual fixation would normally inhibit caloric vestibular responses, the ingestion of alcohol results in a high-frequency, low-amplitude nystagmus. This response, however, is not due to increased vestibular sensitivity, but rather to the suppression, by alcohol (directly or indirectly), of the visual fixation system. This visual inhibition was also evident in the suppression of the optokinetic response by alcohol. Vertigo responses to caloric irrigations showed only slight suppression or some enhancement in darkness following alcohol ingestion; however, blurring of vision was prominent when visual fixation was permitted.

Author

N71-32081# Oklahoma Univ., Oklahoma City. Dept. of Physiology and Biophysics.

EFFECT OF A MOVING OPTICAL ENVIRONMENT ON THE SUBJECTIVE MEDIAN

M. Herbert Brecher and Gerhard A. Brecher Apr. 1971 3 p refs

(Contract FA-67-AC-2699-1)
(FAA-AM-71-22) Avail: NTIS

The placement of a point in the median vertical plane under the influence of a moving optical environment was tested in 12 subjects. It was found that the median plane was displaced in the same direction as the movement of the visual environment when the environment was moved at speeds ranging from 9 plus or minus radians/minute to 45 plus or minus 1 radians/minute. It was established that unidirectional movements of the total optical environment always caused a spatial disorientation with respect to external visual reference points.

Author

N71-32082# Federal Aviation Administration, Oklahoma City, Okla. Civil Aeromedical Inst.

PHYSIOLOGICAL RESPONSES OF LOW TIME PRIVATE PILOTS TO CROSS-COUNTRY FLYING

C. E. Melton and Vincent Fiorica Apr. 1971 8 p refs
(FAA-AM-71-23) Avail: NTIS

Various physiological, biochemical, and psychophysiological measurements were made on low-time private pilots who each flew three cross-country flights. The round-trip flights were 320, 520, and 960 NM in length. Heart rate was recorded continuously throughout the flights. Urine, collected for the 24-hour period surrounding the flights, was differentially analyzed for epinephrine and norepinephrine. None of the measured parameters changed in proportion to the length of the flights; however, the level of stress was high when compared to other types of flying activities. The total stress of such flights must, therefore, be considered to be in direct proportion to the length of the flights.

Author

N71-32083# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.

CIVIL AEROMEDICAL STANDARDS FOR GENERAL USE

AEROSPACE TRANSPORTATION VEHICLES: THE SPACE SHUTTLE FOLLOW-ON

Stanley R. Mohler and Siegfried J. Gerathewohl Jul. 1971 7 p refs

(FAA-AM-71-33) Avail: NTIS

Second-generation general-use aerospace transportation vehicles will evolve, and aerospace medical specialists must provide timely medical criteria for (a) occupant selection, (b) vehicle design features, and (c) operational guidelines. Incorporation of this aeromedical data will result in (a) enhanced mission success and mission efficiency, and (b) minimized opportunity for mission failure, accidents, and long-range adverse consequences due to human factors deficiencies. The data include medical standards for the occupants plus standards for oxygen, nitrogen, carbon dioxide and monoxide, humidity, heat, water vapor, internal noise, radiation, and other items.

Author

N71-32088# Joint Publications Research Service, Washington, D.C.

CYBERNETICS AND REGULATION THEORY

6 Jul. 1971 21 p refs Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 197, no. 6, 1971 p 1280-1290
(JPRS-53531) Avail: NTIS

CONTENTS:

1. BEHAVIORAL SELECTION EXPERIMENTS CITED
N. I. Glazunov et al p 1-7 refs
2. EFFECTS OF VIBRATION ON HUMANS INVESTIGATED
B. A. Potemkin et al p 8-14 refs
3. STOCHASTIC SYSTEM COMBINATIONS DISCUSSED
V. S. Pugachev p 15-19

N71-32089# Joint Publications Research Service, Washington, D.C.

BEHAVIORAL SELECTION EXPERIMENTS CITED

N. I. Glazunov et al In its Cybernetics and Regulation Theory
6 Jul. 1971 p 1-7 refs

Avail: NTIS

A model is constructed to quantitatively examine the performance of automatic machines with normal and disturbed behavior (in the sense of function). In making statistical decisions these characteristics are compared with the behavior of healthy and sick people. The proposed model can be utilized in the diagnostic practice of psychiatric clinics or in engineering psychology.

E.M.C.

N71-32090# Joint Publications Research Service, Washington, D.C.

EFFECTS OF VIBRATION ON HUMANS INVESTIGATED

B. A. Potemkin et al In its Cybernetics and Regulation Theory
6 Jul. 1971 p 8-14 refs

Avail: NTIS

Dynamic reactions of an operator with random vibrational stimuli is treated in relation to biomechanical systems. Transmitting functions of the model were determined from fundamental correlation of statistical dynamics of linear systems. Also, mechanical models were formulated to evaluate frequency characteristics of the human body for various postures. An expression was derived for a chain system model with functions corresponding to impedances of parallel branches and to the dynamic mobility of branches that are in sequence.

E.M.C.

N71-32231* George Washington Univ., Washington, D.C. Medical Center.

SCIENTIFIC PUBLICATIONS AND PRESENTATIONS RELATING TO PLANETARY QUARANTINE. VOLUME 5: THE 1970 SUPPLEMENT

Frank D. Bradley and Margaret F. Werts Aug. 1971 121 p refs

(Contract NSR-09-010-027)

(NASA-CR-121325) Avail: NTIS CSCL 06M

The fourth annual supplement to the original bibliography issued in June, 1967, entitled Scientific Publications of the Biosciences Programs Division, National Aeronautics and Space Administration, Volume V. Planetary Quarantine, is presented. The annual supplements consist of citations of documents relating to planetary quarantine. While they are compiled primarily to bring up to date the survey of the literature in the field, it will be noted that there is also a heavy back gathering of references not previously included. Some of these ante-date the formation of NASA, but are of substantive or historical value to the planetary quarantine program.

Author

N71-32232* Scientific Translation Service, Santa Barbara, Calif. **USING THE METHOD OF SEPARATION AND IDENTIFICATION OF AMINO ACIDS TO DETECT EXTRATERRESTRIAL LIFE [ISPOLZOVANIYE METODA VYDELENIYA I IDENTIFIKATSII AMINOKISLOT DLYA OBNARUZHENIYA ZHIZNI VNE ZEMLI]**

G. A. Lavrentyev Washington NASA Aug. 1971 13 p refs Transl. into ENGLISH of Acad. of Sci. (USSR), Moscow. Inst. for Space Res. report Pr-59

(Contract NASw-2035)

(NASA-TT-F-13765) Avail: NTIS CSCL 06F

A method is developed for separating amino acids from soils on the Earth and for analyzing them. The development of an automatic system which would allow amino acids in soil samples from other planets, to be analyzed by automatic space stations, is proposed.

Author

N71-32239# Defense Documentation Center, Alexandria, Va. **RADIATION INJURIES AND SICKNESS: A DDC BIBLIOGRAPHY, VOLUME 1, MAY 1957-JULY 1970**

May 1971 237 p refs

(AD-722970; DDC-TAS-71-14-1-Vol-1) Avail: NTIS CSCL 6/18

The annotated references were compiled from the Defense Documentation Center's data bank on injuries and sicknesses caused by radiation and radioactive decays. Indexes of corporate author-monitoring agency, subject, and title are provided in this bibliography.

Author (GRA)

N71-32331# Texas Technological Univ., Lubbock. Center of Biotechnology and Human Performance.

PERFORMANCE, RECOVERY AND MAN-MACHINE EFFECTIVENESS Semiannual Progress Report, 1 Sep. 1970-28 Feb. 1971

Richard A. Dudek. 15 Mar. 1971 22 p refs

(Contract DAAD05-69-C-0102)

(AD-723430) Avail: NTIS CSCL 5/8

The basic purpose of the program is the generation of basic data concerning human performance and recovery within several work systems settings under conditions of varied environments, task demands, motivational levels, and nutritional

factors, and further, to generate from this basic data the solution to real problems and recommended procedures for mans operation under varying conditions of the work system. Several conclusions regarding human performance and recovery with pertinence to military application have been made and reported. Specifically six new important conclusions with potential military application have been made relative to continuous operations and work/rest schedules.

Author (GRA)

N71-32433# Federal Aviation Administration, Oklahoma City, Okla. Civil Aeromedical Inst.

ALCOHOL AND DISORIENTATION-RELATED REPONSES. 3: EFFECTS OF ALCOHOL INGESTION ON TRACKING PERFORMANCE DURING ANGULAR ACCELERATION

William E. Collins, Richard D. Gilson (Naval Aerospace Medical Inst.), David J. Schroeder, and Frederick E. Guedry, Jr. (Naval Aerospace Medical Inst.) Apr. 1971 20 p refs

(FAA-AM-71-20) Avail: NTIS

The effects of alcohol ingestion on visual tracking performance (eye-hand coordination) during angular acceleration are considered. Following practice and base-line tests of tracking performance in both static and dynamic conditions, 10 subjects received orange juice which contained 2.0 ml of 100-proof vodka per kg of subject weight; another 10 drank orange juice with a few drops of rum extract added. Tests, conducted 1, 2, 4, 8, and 10 hours after drinking, were in total darkness with the exception of the visual display which was illuminated to recommended levels for cockpit instruments. Static tracking errors for alcohol subjects were significantly higher than those of control subjects only at the 4-hour session. However, alcohol subjects made significantly more dynamic tracking errors than controls during the 1-, 2-, and 4-hour sessions. These data suggest that eye-hand coordination may show little or no impairment following alcohol ingestion in static situations, yet may be seriously degraded during motion.

Author

N71-32434# Federal Aviation Administration, Oklahoma City, Okla. Civil Aeromedical Inst.

A NON-VERBAL TECHNIQUE FOR THE ASSESSMENT OF GENERAL INTELLECTUAL ABILITY IN SELECTION OF AVIATION PERSONNEL

W. Dean Chiles and Roger C. Smith Jun. 1971 12 p refs

(FAA-AM-71-28) Avail: NTIS

A study was conducted in which performance on a non-verbal problem solving task was correlated with the Otis Quick-Scoring Mental Ability Test and the Raven Progressive Matrices Test. The problem solving task, called code-lock, required the subject to determine the correct sequence in which to push five buttons in order to turn on a light. Measures of how quickly the subject responded and how many errors were made on each problem were taken from 45 college student volunteers. Results indicated substantial correlations (.50 to .60) between time measures on the code-lock task and the Otis but very limited relationships between the Raven and each code-lock measure. The implications of these findings for assessment of intellectual abilities are discussed.

Author

N71-32474* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A MODEL FOR MEMORY IN THE BRAIN

James S. Albus Washington Aug. 1971 16 p refs

(NASA-TN-D-6456; G-953) Avail: NTIS CSCL 06B

Among the many different types of memory models, the oldest and most persistent hypothesis has been that memory results from modification of synaptic junctions. The proposed model

is a synaptic junction model which differs only slightly from other synaptic junction models, but the difference is critical. This model, like most others, suggests that facilitation of synapses is caused by coincidence of pre- and post-synaptic activity. But, unlike others, this model distinguishes between synapses in nonspecific and specific neural pathways and postulates that facilitatable memory synapses exist primarily at sites where nonspecific fibers terminate on specific pathways. Author

N71-32520* McDonnell-Douglas Astronautics Co., Huntington Beach, Calif. Advanced Biotechnology and Power Dept.
COMPOSITION AND CONCENTRATIVE PROPERTIES OF HUMAN URINE

David F. Putnam Washington NASA Jul. 1971 110 p refs
 (Contract NAS1-8954)
 (NASA-CR-1802; DAC-61125-F) Avail: NTIS CSCL 06P

The composition of typical human urine is defined and experimental data is presented on its chemical, physical, engineering and concentrative properties. The effects of chemical and electrolytic pretreatments used in aerospace applications for extraction of potable water are included. The results are presented in tables and plots of unsmoothed data, empirical equations, and tables of nominal values. Sample calculations and examples illustrating the consideration of these data in engineering design applications are included. Author

N71-32547 West Virginia Univ., Morgantown.
MECHANICAL PROPERTIES OF THE HEAD

Richard Lynn Stalnaker (Ph.D. Thesis) 1969 130 p
 Avail: Univ. Microfilms Order No. 70-15266

Research was conducted to provide basic information concerning the mechanical responses of the head. The instrumentation and experimental techniques will be used in a survey of materials to be used in the construction of an artificial head. An electromagnetic shaker and a spectral dynamics analyzer were used to determine the mechanical impedance of the live *Macaca mulatta* monkey head, live monkey head with high blood pressure, dead monkey with low blood pressure, dead monkey head with body removed, the dead monkey skull with the brain, and the dead monkey skull. A microminiature accelerometer and pressure transducers were developed for implantation into the brain. This transducer was implanted in three of the five monkeys tested. The acceleration on the side of the head opposite the point of application of the load for driving point impedance was recorded. Dissert. Abstr.

N71-32566# School of Aerospace Medicine, Brooks AFB, Tex.
INFORMATION MODEL DISPLAYING THE PROCESS INVOLVED IN PILOTING AIRCRAFT [OR INFORMATSIONNOY MODELIDLYA OTOBRAZHENIYA PROTSSA PILOTIROVANIYA SAMOLETA LETCHIKOM]

L. I. Vinograi 1971 13 p refs Transl. into ENGLISH from Vopr. Psikhologii (Moscow), v. 13, no. 4, 1967 p 153FF
 (AD-723051; SAM-TT-R-1039-0571) Avail: NTIS CSCL 5/10

An information model is proposed which may be used under laboratory conditions for research or as a display device on the ground as part of the radiotelemetry system used to transmit the parameters of the aircraft to the flight operations command post. The availability to the flight operations officer of information on the behavior curve of the pilot-aircraft system during the actual flight process makes control more effective and visible. He will be able not only to evaluate piloting quality, but also to send corrective commands to the pilot in the event of significant deviations in the

motion parameters from the expected ones, or in the case of an emergency situation. When remote control is used, an additional control and handling team is formed parallel to the pilot-aircraft control team. It consists of the flight operations officer, the radio control and the telemetry equipment. In this case, the flight operations officer becomes an active operator in the complex system of flight control and guidance. Author (GRA)

N71-32572# Stanford Research Inst., Menlo Park, Calif.

A STUDY OF SENSITIVITY TO NOISE Final Report
 R. W. Becker, F. Poza, and K. D. Kryter Jun. 1971 64 p refs
 (Contract DOT-FA69WA-2211)
 (EQ-71-4) Avail: NTIS

About 140 subjects were exposed to simulated sonic booms and recorded residential noises in one, two, or three two-hour sessions over a period of six months. Electrophysiological measures of heart rate and electromyographic responses to the stimuli were analyzed. Biographical, demographical, and personality inventories were also obtained for each of the subjects. The purpose of this research was to: (1) determine whether there are different degrees of psychological and physiological sensitivity to noise in a large group of people, (2) to determine whether and how such sensitivity varied in time, and (3) to relate such sensitivity to other psychological and personality variables. Significant differences in psychological sensitivity to noise were found in the subject population. These differences remained stable for the duration of the experiment and were also found to be related to the attitudinal and belief structures of the individuals. Definite physiological responses to the simulated sonic booms were observed. Author

N71-32602# Astro Nautical Research, Inc., Cambridge, Mass.
REPETITIVE EXCURSION DIVES FROM SATURATED DEPTHS ON HELIUM-OXYGEN MIXTURES. PHASE 3: SATURATION DEPTH 300 FEET

James K. Summitt, John M. Alexander, Edward T. Flynn, and J. Wayne Kulig Washington Navy Exptl. Diving Unit 23 Sep. 1970 27 p refs
 (Contract N00024-70-C-5559)

(AD-723172; NEDU-RR-7-70) Avail: NTIS CSCL 6/19

Three 300-foot HeO₂ saturation dives were conducted at the Navy Experimental Diving Unit to verify a no-decompression repetitive excursion format developed by the Deep Submergence Systems Project (PM-11). The table for this series of dives is the same as the one previously tested and found to be satisfactory for repetitive-excursion dives from a saturation depth of 350 feet. Twelve divers completed a total of 216 man-excursion dives from the saturation depth to depths not exceeding 150 feet deeper than their base depth. No symptoms of decompression sickness were reported during the excursion dives, during the bottom time at 300 feet or throughout the decompression on returning to the surface. Author (GRA)

N71-32622# National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engineering.

HUMAN FACTORS ENGINEERING

Leslie Buck *In its* Div. of Mech. Eng. and the Natl. Aeron. Estab. Mar. 1971 p 19-26 refs
 Avail: NTIS

The interaction between a mechanical system and the human user presents various problems for identification and solution. Considered are man machine aspects of: industrial psychology, human relations, human factors engineering, applied experimental psychology, research on attention, perceptual motor skills, engineering psychology, and mathematical modelling. G.G.

N71-32632# Astro Nautical Research, Inc., Cambridge, Mass.
REPETITIVE EXCURSION DIVES FROM SATURATED DEPTHS ON HELIUM-OXYGEN MIXTURES. PHASE 4: SATURATION DEPTH 500 FEET, SATURATION DEPTH 600 FEET

James K. Summitt, John M. Alexander, Edward T. Flynn, and J. Wayne Kuling 23 Sep. 1970 41 p refs
 (Contract N00024-70-C-5559)
 (AD-723173; NEDU-RR-8-70) Avail: NTIS CSCL 6/19

One 500-foot and two 600-foot saturation dives were conducted at the Navy Experimental Diving Unit to verify a no-decompression repetitive-excursion format developed by the Deep Submergence Systems Project (PM-11). This is the same table previously tested and found to be satisfactory for repetitive-excursion dives from saturation depths of 350 feet and 300 feet. Twelve divers completed a total of 206 man-excursion dives from the respective saturation depths to depths not exceeding 150 feet deeper than their base depth. No symptoms of decompression sickness were reported during the bottom time at 500 feet and 600 feet or during the first 200 feet of decompression back to the surface. This criteria is considered to be satisfactory evidence of the safety of the repetitive-excursion format. Three cases of decompression sickness did occur during the latter stages of decompression, and they are briefly discussed. Author (GRA)

N71-32715# Aerospace Medical Research Lab., Wright-Patterson AFB, Ohio.
A COLLATION OF ANTHROPOMETRY. VOLUME 2: I-Z AND INDEX

John W. Garrett and Kenneth W. Kennedy Mar. 1971 1081 p refs
 (AD-723630; AMRL-TR-68-1-Vol-2) Avail: NTIS HC (Individually priced)/MF \$0.95 CSCL 6/16

The document is volume 2 of a two-volume collation of adult anthropometry, the sources for which are both domestic and foreign, male and female, military and civilian. GRA

N71-32770# Astro Nautical Research, Inc., Cambridge, Mass.
REPETITIVE EXCURSION DIVES FROM SATURATED DEPTHS ON HELIUM-OXYGEN MIXTURES. PHASE 2: SATURATION DEPTH 200 FEET, SATURATION DEPTH 150 FEET

James K. Summitt, Jerry M. Herron, John M. Alexander, J. Wayne Kuling, and Edward T. Flynn 23 Sep. 1971 53 p refs
 (Contract N00024-70-C-5559)
 (AD-723171; NEDU-RR-6-70) Avail: NTIS CSCL 6/19

Two 200-foot and three 150-foot saturation dives were conducted at the US Navy Experimental Diving Unit to verify a no-decompression repetitive-excursion format developed by the Deep Submergence Systems Project (PM-11). Twenty divers completed a total of 360 man-excursion dives from the saturation depths to depths not exceeding 100 feet deeper than their base depth. No symptoms of decompression sickness were reported during the excursion dives, during the bottom time at 200 and 150 feet or during the first 24 hours of decompression back to the surface. This criteria is considered to be satisfactory evidence of the safety of the repetitive-excursion format. Four cases of decompression sickness occurred during decompression to the surface. One case of decompression sickness occurred 8 hours and 21 minutes after surfacing. All five cases are briefly discussed. Author (GRA)

N71-32825# Picatinny Arsenal, Dover, N.J.
FIELD DEPENDENCE AND VISUAL DETECTION ABILITY

Bruce L. Bucklin May 1971 62 p refs
 (AD-724115; PA-TR-4137) Avail: NTIS CSCL 5/10

The perceptual style known as field independence has been defined by various investigators as the ability to perceptually separate an object from within a complex background. This investigation attempts to test this concept in a literal manner by examining the relationship between several established measures of field independence and performance on a real-life visual detection problem. Only one of the instruments used, the Hidden Figures Test, correlated significantly with performance. An added finding was a correlation between performance and general intelligence. Furthermore, interest correlations showed that the instruments used could be divided into two groups, each measuring what appears to be a separate quality of the field independence concept.

Author (GRA)

N71-32863# Istituto di Fisica dell'Atmosfera, Rome (Italy).
ATMOSPHERIC STABILITY AND AEROSOL POLLUTION. PROPOSAL OF A SIMPLE METHOD FOR EVALUATING THE CONDITIONS OF AIR STABILITY

Luigi Mammarella Jan. 1971 11 p
 (IFA-RDP-36) Avail: NTIS

The interaction of atmospheric temperature, humidity, air motion, and temperature inversions, in connection with the transport of aerosol pollutants, are investigated, and a method is proposed to ascertain atmospheric stability. ESRO

N71-32864# Southampton Univ. (England). Inst. of Sound and Vibration.

SOME EFFECTS OF THE VIBRATION OF READING MATERIAL UPON VISUAL PERFORMANCE

J. G. O'Hanlon and M. J. Griffin May 1971 47 p refs
 Sponsored by Min. of Defence
 (ISVR-TR-49) Avail: NTIS

An investigation has been made of the changes in visual acuity when viewing an object vibrating in the frequency range from 5 to 40 Hz. Reading time, error score, and subjective rating of reading difficulty were used as indicators of performance at a Landolt C acuity task. Three experiments were conducted. The first showed that errors increased with frequency from 5 to 40 Hz and with double amplitude from 0.05 in to 0.20 in. Two further experiments investigated in more detail: (1) varying amplitude at constant frequency, 16 Hz; (2) varying frequency at constant double amplitude, 0.1 in. It was found that error score was proportional to the square root of the amplitude of vibration and that the error score was directly proportional to frequency. A relatively small increase in test object size appreciably reduced errors; a 75% reduction in errors was produced by only a 25% increase in the size of the Landolt C's. The same size increase resulted in up to 20% reduction in the time taken to complete the reading task.

Author (ESRO)

N71-32865# Southampton Univ. (England). Inst. of Sound and Vibration Research.

BEHAVIOURAL AWAKENING IN RESPONSE TO INDOOR SONIC BOOMS

P. A. Morgan and C. G. Rice Dec. 1970 40 p refs
 Sponsored by Min. of Technol.
 (ISVR-TR-41) Avail: NTIS

A behavioral awakening study, involving subjection tests of eight persons (mean age 22.9 years), who were each variously exposed to double event impulse noise simulations of a sonic boom over a period of seven consecutive nights, is reported on.

ESRO

N71-32907# Naval Air Development Center, Johnsville, Pa. Aerospace Crew Equipment Dept.

PHYSIOLOGICAL EVALUATION OF SUBJECTS EXPOSED TO A COLD WATER ENVIRONMENT WHILE WEARING DIFFERENT PROTECTIVE SUIT ASSEMBLIES Interim Report

Louis J. Santa Maria and Meredith H. Radliff 15 Mar. 1971 29 p refs

(AD-724617; NADC-AC-7101) Avail: NTIS CSCL 6/17

The physiological responses of two volunteer subjects exposed to an extreme cold water environment (OC) while wearing the 3/16 inch Chloroprene Wet Suit, 1/8 inch Chloroprene Wet Suit, and the Polyvinyl Chloride Wet Suit were investigated under two conditions of use: constant immersion-flotation (COND I) and immersion-flotation for a two-minute period followed by raft occupancy (COND II). In view of exposure duration ranging from 0.5-1.0 hr and from 2.0-3.0 hr under CONDITIONS I and II, respectively, the results indicate that survival and tissue damage protection is afforded, within expected limits of time under both emergency conditions for search and recovery, by any of the clothing assemblies tested. It is recommended, therefore, that the 1/8 inch Chloroprene Wet Suit be considered as the most acceptable on the basis of such physical characteristics as reduced weight and bulk.

Author (GRA)

N71-32925# Army Natick Labs., Mass. Clothing and Personal Life Support Equipment Lab.

THE BEHAVIOR OF PROTECTIVE UNIFORMS IN LARGE SCALE SIMULATED FIRES

Mar. 1971 51 p

(AD-724648; C/PLSEL-TS-172; USA-NLABS-TR-71-40-CE) Avail: NTIS CSCL 6/17

The report describes a new test facility developed at the U. S. Army Natick Laboratories for exposing clothed manikins to large fuel (JP-4) fires and gives the results of evaluations made of several protective systems developed for hot and cold weather aviators uniforms.

Author (GRA)

N71-32968# Istituto Superiore di Sanita, Rome (Italy). Lab. di Fisica.

PROCEDURE MANUAL FOR THE DEPARTMENT OF ELECTRON MICROSCOPY. 2: PREPARATION OF EMBEDDED BIOLOGICAL SPECIMENS [RICETTARIO AD USO DEL REPARTO DI MICROSCOPIA ELETTRONICA. 2: ALLESTIMENTO DEI PREPARATI INCLUSI]

23 Mar. 1970 77 p refs In ITALIAN; ENGLISH summary

(ISS-70/8) Avail: NTIS

Chemical, physical and biological procedures employed in the department of electron microscopy are reported. The isolation procedure of the biological material and the fixation, dehydration and embedding methods are described.

Author

N71-33087# New Mexico State Univ., University Park. Dept. of Psychology.

PREDICTING HUMAN PERFORMANCE 2: LAWS OF THE VISUAL REACTION TIME

Warren H. Teichner and Marjorie J. Krebs Apr. 1971 59 p refs

(AD-724001; NMSU-ONR-TR-71-1) Avail: NTIS CSCL 5/10

The literature on the reaction time to a flash of light was reviewed and 14 studies published between 1896 and 1969 were selected as having provided sufficient methodological detail and data appropriate for quantitative analysis of the effects of the

following selected variables: Luminance, duration, size of stimulus, contrast, and background luminance, response to stimulus onset vs. offset of the signal, and monocular vs. binocular viewing. Conclusions were drawn about the effects of each variable and/or the status of the research literature concerning it. Mathematical relationships were developed which can be used to predict binocular RTs over a wide range of luminance, signal duration and signal size. These relationships appear sufficiently reliable to be used for purposes of equipment design. The data were also considered in theoretical terms. It was shown that the product of RT and luminance may be used to represent a response criterion in the sense implied by the theory of signal detection as developed in recent latency models.

Author (GRA)

N71-33088# Defense Documentation Center, Alexandria, Va. **ENVIRONMENTAL POLLUTION: NOISE POLLUTION EAR PROTECTORS, VOLUME 1 Report Bibliography, Nov. 1943-Sep. 1970**

Jun. 1971 68 p refs

(AD-724650; DDC-TAS-71-23-1) Avail: NTIS CSCL 20/1

This is Volume I of a two-volume set on Environmental Pollution: noise Pollution - Ear Protectors in a series of bibliographies on Environmental Pollution. Annotated references concerning ear protective devices, such as earmuffs, earplugs and helmets to be used against airplane noise, gun blasts, industrial plant noise, high-intensity impulse noise, combat noise, and guided missile launchings are included. Corporate Author-Monitoring Agency. Subject, Title, and Report Number indexes are included.

Author (GRA)

N71-33123# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.

AVIATION HELMETS Final Report

26 Apr. 1971 21 p refs

(AD-724080; MTP-7-3-085) Avail: NTIS CSCL 6/17

Procedures are provided for determining the functional suitability of aviation helmets. Protective features and compatibility with airborne communication systems are discussed.

Author (GRA)

N71-33125# Navy Experimental Diving Unit, Washington, D.C. **REVISED TABLES OF APPROPRIATE OXYGEN PERCENTAGES FOR SELECTED PARTIAL PRESSURES AT VARIOUS DEPTHS Final Research Report**

Thomas E. Berghage and Gilbert C. Tolhurst 1 Apr. 1971 94 p refs Revised

(AD-724282; NEDU-RR-4-71) Avail: NTIS CSCL 6/11

The report was written to promulgate a revised set of tables to allow rapid and easy conversion of water depth and partial pressure combinations into appropriate oxygen per cent to be used by divers and diving supervisors. The tables were devised for use when making necessary conversions between depth in feet of sea water and pressure in terms of atmospheres absolute.

Author (GRA)

N71-33138# Human Engineering Labs., Aberdeen Proving Ground, Md.

COLOR, DIFFERENTIAL LUMINANCE AND SUBJECTIVE DISTANCE

Claude N. McCain, Jr. and A. Charles Karr Apr. 1971 19 p refs

(AD-724623; HEL-TM-4-71) Avail: NTIS CSCL 5/10

A modified Howard-Dohman type apparatus was used to quantify the ability of 12 observers to adjust the relative distance of grey, red and blue rods under six relative luminance combinations (left or right rod having equal, one-half, or one-quarter the luminance of its comparison rod). The observers perceived the red rod as nearer than the blue under all conditions, with no significant effect of luminance under any condition. It was concluded that color per se is a cue for depth.

Author (GRA)

N71-33148# Human Resources Research Organization, Alexandria, Va.

PREDICTION OF ARMY AVIATOR PERFORMANCE: DESCRIPTION OF A DEVELOPING SYSTEM

Wiley R. Boyles and James L. Wahlberg Apr. 1971 11 p refs Presented at the Ala. Psychological Assoc. Ann. Meeting, Ala., May 1970 /ts HumRRO Prof. Paper No. 5-71

(Contract DAHC19-70-C-0012)

(AD-724696) Avail: NTIS CSCL 5/9

The development of a multivariate prediction system aimed at having useful predictors available early in the training of potential Army aviators is discussed. Using this system, supervisors will be able to relate a predictor score to a probability table, this enabling administrators to make early decisions involving further training of Army aviators.

Author (GRA)

N71-33149# Human Resources Research Organization, Alexandria, Va.

PEER RATINGS AS PREDICTORS OF SUCCESS IN MILITARY AVIATION

James L. Wahlberg, Wiley R. Boyles, and H. Alton Boyd Mar. 1971 Presented at Ala. Psychological Assoc. Ann. Meeting, Ala., May 1970 /ts HumRRO Paper No. 1-71 19 p refs (Contract DAHC19-70-C-0012)

(AD-724695) Avail: NTIS CSCL 5/9

Three experimental peer rating forms were developed for use in research in prediction of the aviation training performance criterion--completion/attrition--from the training program for Aviation Warrant Officer Candidates at the U.S. Army Helicopter School. The paper describes the construction of the ratings, the Potential Aviator Rating forms, and compares the validity of these forms with the Contemporary Evaluation Form (CEF) used by the U.S. Army Helicopter School. The basic comparison involved validity between absolute scale and ranks. The original validity coefficients were sufficiently high to anticipate that the use of peer ratings may increase predictive accuracy in a multivariate system.

Author (GRA)

N71-33187# Louisville Univ., Ky. Performance Research Lab.

EFFECTS OF FIGURAL NOISE, ROTATION, AND OTHER TASK VARIABLES ON THE VISUAL PERCEPTION OF FORM

John B. Thurmond Feb. 1971 53 p refs

(Contract DAHC19-69-C-0009; Proj. Themis)

(AD-723992; ITR-71-18) Avail: NTIS CSCL 5/10

The results of four experimental investigations of the perceptual performance obtained with tasks displaying visual information are reported. Metric figures were used in each experiment--visual forms that are analogs of the amplitude modulated waveforms that characterize the signals of certain sonar and radar presentations.

Among the general conclusions reached regarding ways of optimizing visual displays of complex information were the following: The display should provide increased cues for discrimination by enhancing the visibility of features that distinguish one pattern from another rather than providing finer figural detail. Increasing the signal-to-noise ratio of the displayed information will benefit the observer in situations where rotations of the display relative to the observer are unavoidable. Analogs of amplitude-modulated waveforms used to represent complex information visually may be more easily identified when they take the form of patterns that distribute the visual features radially, rather than horizontally, in each shape. Unless practical considerations dictate otherwise, the visually patterned information should be displayed as solid shapes against a uniform background rather than shapes which are outlined in form.

Author (GRA)

N71-33221*# Exotech, Inc., Washington, D.C.

PLANNING, EVALUATION AND ANALYTICAL STUDIES TO IMPLEMENT PLANETARY QUARANTINE REQUIREMENTS Quarterly Progress Report

Edward J. Bacon Aug. 1971 48 p

(Contract NASw-2062)

(NASA-CR-121423; QPR-5) Avail: NTIS CSCL 06M

Activities are summarized in support of the evaluation of planetary quarantine requirements, the quarantine document system for planetary flights, microbial contamination logs for Venus and Mars, evaluation of flight project quarantine plans, supporting technology transfer, specification of the probability of microbial transfer, estimation of the encapsulated microbial burden, and supporting analysis of planetary quarantine and sterilization parameters. Presentations are appended including an analysis of microbial release probabilities; an estimation of buried microbial burden; and safety margins and implementation of planetary quarantine requirements.

J.M.

N71-33223*# Wisconsin Univ., Madison. Dept. of Radiology.

SKELETAL STATUS AND SOFT TISSUE COMPOSITION OF ASTRONAUTS. DETERMINATION OF BODY COMPOSITION IN VIVO Progress Report, 15 Jun. 1970-15 Jun. 1971

John R. Cameron 15 Jun. 1971 177 p refs

(Grant NGR-50-002-051; Contract AT(11-1)-1422)

(NASA-CR-121415) Avail: NTIS CSCL 06P

A summary is presented of research and instrument development in the area of bone mineral content and body composition measurement in vivo.

Author

N71-33232*# California Univ., Berkeley. Space Sciences Lab.

ENZYME ACTIVITY IN TERRESTRIAL SOIL IN RELATION TO EXPLORATION OF THE MARTIAN SURFACE Semiannual Progress Report

A. D. McLaren, W. H. Brams, R. G. Burns, and A. H. Pukite 1 Jul. 1971 39 p refs /ts Ser. 12, Issue 57

(Grant NGL-05-003-079)

(NASA-CR-121446; SAPR-14) Avail: NTIS CSCL 08M

Enzyme activities in soil are explored including abundance, persistence, and localization of these activities, in an attempt to develop procedures for detection and assay of enzymes in soils suitable for life in planetary soils. A sensitive test for soil urease was made based on hydrolysis of heat-stable C-14 urea and the urease activity of ancient and buried soils is described. A mathematical model was developed, based on enzyme action and microbial growth in soil, for rates of oxidation of nitrogen as

nitrogen compounds are moved downward by water flow. This biogeochemical model is applicable to any percolating system, with suitable modification for special features, such as oxygen concentrations, types of hydrodynamic flow, etc. A suitable extraction procedure for soil enzymes is reported, and measuring activities in one such extract are detailed in order to study how urease is complexed in soil organic matter. Nearly 30 percent of soil enzymes can be isolated as colloidal, clay-free suspensions. Author

N71-33251*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

HYPOGRAVIC AND HYPODYNAMIC ENVIRONMENTS

Raymond H. Murray and Michael McCally, eds. Washington 1971 380 p refs Conf. held at French Lick, Ind., 16-18 Jul. 1969; Sponsored in part by Armour Pharm. Co., Lederle Labs., Merck, Sharp, and Dohme, and Sandoz Pharm. (NASA-SP-269; A-3652) Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06P

Papers and discussions are presented dealing with hypodynamic and hypogravic aspects of the space flight environment, particularly inactivity, confinement, and weightlessness.

N71-33252*# National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.

SPACEFLIGHT DECONDITIONING: AN OVERVIEW OF MANNED SPACEFLIGHT RESULTS

Lawrence F. Dietlein *In its* Hypogravic and Hypodyn. Environments 1971 p 1-26 refs
Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06P

Physiological changes observed in astronauts during manned space flights are reviewed. Results of studies indicate that major physiological systems undergo consistent and predictable changes as a result of space flight. Changes were observed in the cardiovascular and musculoskeletal systems; composition and quantity of body fluids, including the blood; and in certain hormone and blood cell levels. Results derived from Mercury, Gemini, and Apollo flights through Apollo 10 are summarized. A.L.

N71-33253*# National Aeronautics and Space Administration. Manned Spacecraft Center, Houston, Tex.

HEMATOLOGIC IMPLICATIONS OF HYPODYNAMIC STATES

Craig L. Fischer, Carolyn Leach, and Philip C. Johnson (Baylor Coll. of Med.) *In its* Hypogravic and Hypodyn. Environments 1971 p 27-34 refs
Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06P

The red cell mass and plasma volume changes noted in the hypodynamic states of bed rest and water immersion are reviewed, and these changes are compared with the hypodynamic and hypogravic state characteristics of earth orbital missions. Author

N71-33254*# Texas Womens Univ. Research Inst., Denton, Tex.
BONE DENSITY CHANGES IN THE ASTRONAUTS DURING SPACEFLIGHT

Pauline Berry Mack *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 35-50 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

The astronaut bone density studies described were designed to determine: (1) the extent of bone density loss experienced during spaceflight; (2) possible means of reducing such losses; and (3) the rate of postflight recovery of any bone mineral loss. Author

N71-33255*# National Institutes of Health, Bethesda, Md.

METABOLIC STUDIES OF THE GEMINI 7 14-DAY ORBITAL SPACEFLIGHT

G. Donald Whedon and Leo Lutwak (Cornell Univ., Ithaca) *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 51-84 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

Described is the effort undertaken to perform complete metabolic balance studies of two astronauts during a 10-day preflight control phase, 14 days of orbital spaceflight (NASA Gemini 7), and a 4-day postflight recovery phase. The studies included measurement of dietary intakes and excretions of calcium, magnesium, phosphate, sulfate, nitrogen, sodium, potassium, and chloride; urinary excretions of 17-hydroxycorticosteroids, aldosterone, and catecholamines were also measured. This study was planned within the rigorous constraints of the technical characteristics of the flight itself. These characteristics included astronaut training, geographic and temporal aspects of the flight plan and schedule, and the limited volume of the space vehicle. In addition, the medical observations, including certain hematologic and cardiovascular measurements, as well as the metabolic study, were but a part of the total effort, including extensive operational and physics-oriented experimental activities required of the astronauts before, during, and after the flight. Author

N71-33256*# Leeds Univ. (England).

ASSESSMENT OF BONE MASS IN RELATION TO INACTIVITY

B. E. Christopher Nordin, A. Horsman, and L. Bulusu *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 85-98 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

Existing techniques for the measurement of changes in bone mass due to immobilization are reviewed. The techniques are morphometry, X-ray densitometry, gamma ray densitometry, and neutron activation. Also examined was measurement of calcium loss in urine. Results of the study indicate that no densitometric procedure is likely to be as sensitive in detecting the onset of osteoporosis as the chemical measurement of the loss of bone mineral in the excreta. Although full metabolic balances with turnover studies represent the ideal way of observing the metabolic changes, the measurement of the rate of calcium excretion in the fasting state could be a valuable substitute under space flight conditions. A.L.

N71-33257*# Wisconsin Univ., Madison. Medical Center.

SOME PHYSICAL METHODS OF SKELETAL EVALUATION

John R. Cameron, John M. Jurist, and Richard B. Mazess *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 99-110 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

Changes in the musculoskeletal system occur in hypodynamic and hypogravic conditions; these changes, which occur in both bed bound patients and astronauts, may lead to medical problems. Some of the major changes are summarized, and newer physical methods useful in their measurement reviewed. Author

N71-33258*# Mayo Clinic, Rochester, Minn.

BONE AT THE CELLULAR LEVEL: THE EFFECTS OF INACTIVITY

Jenifer Jowsey *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 111-120 refs (Grant AM-8658)

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06S

Various degrees of inactivity result in loss of bone known as osteopenia, ranging from severe, almost complete immobilization or paralysis, where severe osteopenia is the rule, to more subtle bone loss, reported as a result of lack of gravitational force imposed on astronauts. Several questions are considered that have arisen from the relatively few studies conducted to date. These are: (1) What is the mechanism of bone loss development? (2) Is increased resorption a feature of immobilization? (3) What is the physiologic mechanism of bone loss? (4) What factors will prevent the development of disuse osteopenia? Author

N71-33259*# Harvard Univ., Boston, Mass. School of Medicine.
ESTIMATION OF TOTAL SKELETAL MASS IN MAN BY RADIOISOTOPE DILUTION

Robert M. Zollinger, Jr. (Peter Bent Brigham Hosp.) and Francis D. Moore *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 121-128 refs Sponsored in part by AEC, NIH, Army Med. Res. and Develop. Command and John A. Hartford Found., Inc.

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06P

An attempt to predict skeletal weight using the compositional terms of exchangeable potassium ($K_{sub e}$) and fat free solids (FFS) was made from the observed values in isotope studies and calculated values obtained from regressions based on weight, sex, and age. The predicted values were then combined with data developed by Allen, and an equation devised that related skeletal size to $K_{sub e}$ and the $K_{sub e}$ /FFS ratio. Derivation of the equation and the supporting body composition regressions to predict the compositional values needed are outlined. Additional data, from a patient with antemortem isotope dilution studies and postmortem skeletal dissection with chemical analysis, are presented for both the verification of this technique and for discussion of actual measurements of skeletal size in man. Author

N71-33260*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

DISUSE ATROPHY IN MACACA MULATTA AND ITS IMPLICATIONS FOR EXTENDED SPACE FLIGHT

Leon E. Kazarin and Henning E. von Gierke *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 129-144 refs

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06S

In order to study the mechanisms operative in producing changes in bone structure, the time constants involved, the reversibility of these effects, and corrective measures to counteract these adverse effects, a program was initiated to investigate the response of the Rhesus monkey to prolonged plaster of paris immobilization. Changes in bone structure as well as quantitative changes of bone strength in situ were observed. As a means of evaluating the practical and operational significance of these changes, some of the primates were exposed after immobilization to impact loads for which injury probability for normal controls was known. The monkeys were restrained in a zoometrically designed seat and exposed to longitudinal transient acceleration in experiments designed to produce vertebral fracture of the type seen in man during longitudinal spinal impact. Some of these immobilized and impacted animals were allowed to recover for 7 months under normal conditions so that delayed manifestations of the impact trauma and recovery could be observed. The basic structural changes of bone and changes in spinal impact tolerance resulting from prolonged immobilization are summarized. Author

N71-33261*# Georgetown Univ. Hospital, Washington, D.C.

NONDESTRUCTIVE MEASUREMENT OF SOME PHYSICAL PROPERTIES OF BONE

W. F. Abendschein and G. W. Hyatt *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 145-170 refs

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06P

Investigations have emphasized the development of nondestructive methods for precise determination of the functional characteristics of bone. These include such physical properties as density, breaking strength, and modulus of elasticity. Tests were performed on normal and pathologic specimens of human tibial cortical bone to develop and document the relationship of destructive and nondestructive testing, and to investigate the correlation, ultrasonic velocity measurements, mass density measurements, and mechanical loading. A.L.

N71-33262*# Texas Univ., Dallas. Southwestern Medical School.
EFFECTS OF BED REST ON THE OXYGEN TRANSPORT SYSTEM

Gunnar Blomquist, Jere H. Mitchell, and Bengt Saltin *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 171-186 refs (Grant HE-06296)

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06S

Current data on circulatory effects of bed rest are discussed against the background of a recent laboratory study dealing with adaptive changes in oxygen transport and body composition after bed rest and after training. In this investigation, maximal oxygen uptake was used as the index of maximal cardiovascular function. Five 19 to 21 year old college students were selected for the study. The investigation was divided into three phases: (1) a short control period; (2) a 3-week bed rest period; and (3) a 2-month physical training period. Identical sets of studies were performed at the end of each period. Results of the three phases are discussed and presented tabularly and graphically. A.L.

N71-33263*# Public Health Service Hospital, San Francisco, Calif.
HEMODYNAMIC AND BODY FLUID ALTERATIONS INDUCED BY BEDREST

Kenneth H. Hyatt *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 187-210 refs

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06S

Studies were undertaken to develop an understanding of adaptation physiology. In these studies, all subjects were healthy male volunteers, aged 21-35. There have been three types of studies: 10-day, 14-day, and 28-day bed rest. In all cases subjects were carefully screened to exclude disease, and were subjected to a noninstrumented 70 deg foot-down passive tilt prior to entry into the study to exclude those with autonomic insufficiency. Statistical analysis was performed by a paired Student's test. Results of the 14-day and 28-day studies are presented. The results of the 10-day bed rest study have been previously reported by NASA. A.L.

N71-33264*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

EFFECTS OF BED REST ON FOREARM VASCULAR RESPONSES TO TYRAMINE AND NOREPINEPHRINE

Philip G. Schmid, Michael McCally, Thomas E. Piemme, and James A. Shaver *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 211-224 refs

Avail: NTIS HC\$6.00/MF\$0.95 CSCL06S

To test for disturbances in the peripheral adrenergic nerve function, observations were made of forearm vascular responses to brachial artery infusions of tyramine and norepinephrine after two

weeks of bed rest and after control periods of normal vigorous daily activity. The study was subdivided into three periods. An initial control period consisted of 8 days of unrestricted activity. The second period consisted of 12 days of bed rest. The third, or recovery period, consisted of 6 more days of activity and began when the subjects got out of bed. Experiments were conducted on the last day of each period and care was taken to conduct separate sessions under the same conditions. The test periods are discussed and results are presented of the basal values measured before and during infusions of the drugs. Measurements of total catecholamines in the urine are also presented. A.L.

N71-33265*# School of Aerospace Medicine, Brooks AFB, Tex.
THE EFFECT OF TOTAL BODY EXERCISE ON THE
METABOLIC, HEMATOLOGIC, AND CARDIOVASCULAR
CONSEQUENCES OF PROLONGED BED REST

Malcolm C. Lancaster and John H. Triebwasser *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 225-248 refs

Avail: NTIS HC\$6.00/MF\$0.95 CSCL 06S

The first phase of a study of exercise effects in the prevention of the physiological changes induced by prolonged bed rest has been completed. Because all analyses have not been completed, metabolic and certain special assays, such as renin, renin substrate, and ADH, are not reported. Also, some of the hematologic data have not been evaluated. Eight male subjects participated in the experiment which covered a period of 16 weeks; 5 weeks of control, 5 weeks of bed rest, and 6 weeks of recovery. All exercise was performed on a special total body ergometer that simulates zero gravity while permitting exercise under conditions of normal stress to the fully ambulatory musculoskeletal system. Results are presented of orthostatic stress tests, psychomotor tests, work tolerance, and psychobiologic studies. A.L.

N71-33266*# Public Health Service Hospital, San Francisco, Calif.
THE EFFECTS OF LONG-TERM BED REST ON MINERAL
METABOLISM

Charles L. Donaldson, Donald E. McMillan, Stephen B. Hulley, Robert S. Hattner, and Jon H. Bayers *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 249-260 refs

(NASA Order T-58941; NASA Order T-81070)

Avail: NTIS HC\$6.00/MF\$0.95 CSCL 06S

This study was initiated to determine the effect of long term bed rest on mineral balance and bone density in normal individuals. Three healthy male volunteers were studied during 4 weeks of ambulation, 30 to 36 weeks at rest in bed, and another 4 weeks of ambulation after bed rest. They were maintained on a diet of 2100 calories with 908 mg calcium and 1386 mg phosphorus throughout ambulation and bed rest. Calcium and magnesium in serum, urine, sweat, stool, and diet were determined by atomic absorption spectrophotometry. Standard autoanalyzer methods were used for measuring phosphorus. A second phase of the study, comparing the effectiveness of exercise with that of phosphate in modifying the changes of bed rest, showed that isometric and isotonic exercise has not proved effective in preventing the negative mineral balance induced by bed rest. Results indicated that nine months of horizontal bed rest caused distinct os calcis demineralization in three healthy young men, accompanied by a negative calcium balance that persisted until reambulation. Measure: designed to prevent these changes of calcium balance and bone are under investigation. A.L.

N71-33267*# Public Health Service Hospital, San Francisco, Calif.
CHANGES IN BONE MINERAL CONTENT OF THE OS

CALCIS INDUCED BY PROLONGED BED REST

John M. Vogel *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 261-270 refs

(NASA Order T-58941; NASA Order T-80173)

Avail: NTIS HC\$6.00/MF\$0.95 CSCL 06S

The effects of prolonged bed rest on bone and calcium metabolism and methods that might effectively alter the mineral loss known to result from bed rest were investigated. Three subjects in their twenties were selected to undergo a 9 month period of bed rest. They were maintained on a rigidly controlled metabolic diet that contained 910 mg calcium per day. Gamma ray densitometry was performed at regular intervals from months 3 to 9 of bed rest and for 5, 7, and 8 months after reambulation. This study demonstrated that there is a significant loss of mineral content of the os calcis during 9 months of bed rest. There is a rapid regain after ambulation, which does not reach prebed rest values until 4 to 6 months have elapsed. It was concluded that prolonged periods of bed rest, and therefore zero gravity conditions, can materially reduce the mineral content of the os calcis and place this bone at risk when ambulation or gravity conditions are reinstituted. A.L.

N71-33268*# Case Western Reserve Univ., Cleveland, Ohio.
THE RELATIONSHIP BETWEEN THE DIURNAL AND
MEAL-DRIVEN RHYTHMS OF KIDNEY FUNCTIONS IN
SUBJECTS AT REST

Olgard Lindan *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 271-280 refs

(Grant HED-RD-1144-M)

Avail: NTIS HC\$6.00/MF\$0.95 CSCL 06S

In order to study the relationship between diurnal and meal driven excretory patterns in the human kidney, and the possible effect on the kidney of the removal of the diurnal clock, study subjects with normal controls and patients paralyzed with high spinal cord injury were studied while confined to bed. The test schedules lasted from 14 to 21 days and the total average food intake was identical for each subject. The drinking was given either with meals or independently at random. In this study, the diurnal kidney cycle was dwarfed with meal cycles by having the subject consume large meals at regular frequencies, uncorrelated with the day/night cycle. It was not surprising that the results indicated that the kidney should be governed tightly in its activities by the intake of food, however, it was puzzling that certain of its homeostatic mechanisms should apparently follow a day/night cycle. The primary triggering mechanism and the purpose of the diurnal cycle for electrolyte excretion is unknown. A.L.

N71-33269*# Pittsburgh Univ., Pa.
EFFECTS OF TWO WEEKS OF BED REST ON
CARBOHYDRATE METABOLISM

Thomas E. Piemme *In* NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 281-288 refs

Avail: NTIS HC\$6.00/MF\$0.95 CSCL 06S

In view of the apparent inefficient handling of glucose during bed rest and inactivity, a carefully controlled study was conducted to investigate the nature of the carbohydrate intolerance observed during bed rest and some of the factors that might produce such intolerance. Seven health subjects were placed under strict dietary control and supervised activity for a period of four weeks. The first and fourth weeks served as control and recovery periods, respectively, and the second and third weeks comprised the period of enforced bed rest. All subjects showed an elevated peak glucose level and an increased area under the 4-hr glucose curve during the bed rest period as compared with the control period. Insulin

responses to glucose administration were markedly augmented during the bed rest cycle. Insulin response to each of three different stimuli was augmented during bed rest in all subjects. Results appear to indicate that there is a relative ineffectiveness of insulin in lowering blood glucose levels during recumbency. A.L.

N71-33270*# School of Aerospace Medicine, Brooks AFB, Tex.
THE EFFECT OF BED REST ON GLUCOSE REGULATION IN MAN: STUDIES IN PROGRESS

Frank R. Lecocq / In NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 289-298 refs

Avail: NTIS HD \$6.00/MF \$0.95 CSCL 06S

Data are presented from two bed rest studies in which isolated parameters of glucose balance during bed rest were investigated. In one study, forearm glucose uptake during glucose loading was measured; in the other study, the effect of an intracellular hypoglycemic agent (2 deoxy-D-glucose) on glucoregulatory hormones was examined. The forearm glucose uptake study was designed to determine the quantitative significance of peripheral glucose uptake in subjects maintained at bed rest for 14 days. Infusion of 2 deoxy-D-glucose before, during, and after 14 days of bed rest was designed to confirm and amplify previous observations that the hypodynamic condition imposed by bed rest decreases pituitary growth hormone responsiveness. Test results showed that significant alterations in both peripheral glucose utilization during glucose loading and glucoregulatory hormone response to intercellular glucopenia are induced by simple absolute bed rest. Whether these changes represent a homeostatic adaption to bed rest or have pathophysiological significance could not be concluded from these data. However, these findings have significance for both clinical medicine and for the assessment of human response to the effects of prolonged space flight. A.L.

N71-33271*# School of Aerospace Medicine, Brooks AFB, Tex.
HEMATOLOGIC ASPECTS OF BED REST

Malcolm C. Lancaster / In NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 299-322 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

Results are presented of studies in which the red cell mass (RCM) loss that occurs with bed rest was documented by means of direct red cell label. Twenty-one healthy males participated in the experiment which consisted of a 20-day adjustment phase, 35 days of continuous absolute bed rest, and a 20-day recovery phase. Eight additional males were used to control such variables as age, blood lettings, seasonal changes, and stability of red cell and plasma volumes. The RCM decreased during bed rest in 18 of the 21 subjects with an average loss of 140 ml representing approximately 8 percent of the RCM. Plasma volumes determined by indirect estimation of RCM and corrected microhematocrit decreased some 400 ml during bed rest, and plasma volumes determined at the end of the recovery by a direct method showed values well above those obtained prior to bed rest. Stool tests for occult blood were consistently negative. The results reported agree with the previously described plasma volume changes that occurred during bed rest, where plasma volume was determined by either T-1824 or radiiodinated serum albumin, and the RCM was determined indirectly. A.L.

N71-33272*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

IMMERSION TECHNIQUES AND THE EVALUATION OF SPACEFLIGHT DECONDITIONING COUNTERMEASURES

Michael McCally and Charles C. Wunder (Iowa State Univ. of Sci. and Technol., Ames) / In NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 323-344 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

The physiological effects of water immersion in simulating weightlessness are reviewed. Discussed are: (1) cardiovascular effects; (2) body fluid volumes; (3) renal effects; (4) lung volumes; (5) intrapulmonary pressure and pressure-volume relationships; (6) role of transpharyngeal pressure gradient; (7) temperature effects; and (8) space crew performance. Also presented are the results of a study designed to test the relative effectiveness of six different countermeasures for deconditioning: venous occlusive cuffs; an elastic gradient counterpressure garment or leotard; exposure to lower body negative pressure; ADH administration; positive pressure breathing at 15 mm Hg; and mild cold exposure. A.L.

N71-33273*# Frie Univ., Berlin (West Germany).

BODY FLUID REGULATION DURING IMMERSION

Otto H. Gauer / In NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 345-356 refs

(Contract F61052-68-C-0069)

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

The effects of posture on body fluid circulation; blood volume control and weightlessness; and the effects of water immersion on renal function, plasma volume, distribution of extracellular fluid volume, venous tone, and physical working capacity are discussed. A.L.

N71-33274*# Webb Associates, Yellow Springs, Ohio.

DECONDITIONING AND ITS PREVENTION BY SIMULATING THE HYDROSTATIC GRADIENT

Paul Webb / In NASA. Ames Res. Center Hypogravic and Hypodyn. Environments 1971 p 357-372 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06S

Methods of detecting cardiovascular deconditioning and ways of preventing it by simulation of the hydrostatic gradient are described. Briefly discussed are the techniques of continuous and prolonged water immersion, and the use of a special antideconditioning garment that simulates hydrostatic gradient by use of external bladders arranged on the limbs and trunk. A.L.

N71-33275*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

RESEARCH DIRECTIONS: DISCUSSION

In its Hypogravic and Hypodyn. Environments 1971 p 373-390 refs

Avail: NTIS HC \$6.00/MF \$0.95 CSCL 06P

A general discussion is presented of what further studies should be done, particularly those studies that would have practical importance for determining whether man is, or will be, qualified for the very long space flights in the future. Some of the problems to be considered are: the magnitude of mineral loss; the meaning of the apparent depression in 17-hydroxycorticosteroids; factors besides weightlessness that make up the space flight environment; changes in metabolic systems induced by use of countermeasures suits; weightlessness simulation; and deconditioning. A.L.

N71-33276# Defense Documentation Center, Alexandria, Va.
RADIATION EFFECTS, VOLUME 1 Report Bibliography, Jan. 1965-Dec. 1970

Jun. 1971 383 p refs

(AD-724600; DDC-TAS-71-24-1-Vol-1) Avail: NTIS HC \$6.00/MF \$0.95 CSCL 6/18

The bibliography contains references on effects of gamma rays, fission fragments, and neutrons, on organisms, food, tissues, the nervous system, etc. The bibliography also includes Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes. Author (GRA)

N71-33329# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

ENCODING FUNCTION OF SYNCODERS Final Report, Mar. 1967-Mar. 1968

Marvin C. Ziskin and J. Ryland Mundie Mar. 1971 56 p refs (AD-724072; AMRL-TR-70-119) Avail: NTIS CSCL 6/4

The syncoder is an electronic information processing device based on neurophysiological principles. Its performance can be separated into a summing function and an encoding function. This report discusses the encoding function. Encoding consists of comparing the output voltage of the summing function with an internally generated time varying threshold voltage. When the voltages are equal, an output pulse is generated and the threshold is reset to its initial value. The entire process is then recycled. The response of the encoding function to time variant and to time invariant signals is presented. Also illustrated are the effects of variations in the syncoder parameters. Author (GRA)

N71-33380*# Boeing Co., Seattle, Wash. Aerospace Group.
EFFECTS OF AEOLIAN EROSION ON MICROBIAL RELEASE FROM SOLIDS

E. A. Gustan, R. L. Olson, D. M. Taylor, and R. H. Green Jun. 1971 7 p refs Prepared for JPL (Contract NAS7-100) (NASA-CR-121422) Avail: NTIS CSCL 06M

Studies have shown that microorganisms can become encapsulated in selected spacecraft solid materials and under specific conditions survive to arrive on planetary surfaces. This investigation was initiated to determine the percentage of spores that would be expected to be released from the interior of the solid materials by aeolian erosion on a planetary surface. The information obtained can be used in calculations to determine the probability of microbial release in the total planetary quarantine probability equation. Methyl methacrylate and Eccobond discs were fabricated so that each disc contained approximately 40,000 *Bacillus subtilis* var. *niger* spores. The discs were placed in a specially designed sandblasting device and eroded. Exposure periods of 0.5, 2 and 24 hours were investigated using filtered air to accelerate the sand. A series of tests was also conducted for a 0.5 hour period using carbon dioxide. Examination of the erosion products showed that less than one percent of the spores originally contained in the solids was released by aeolian erosion. Author

N71-33400*# Hamilton Standard, Windsor Locks, Conn.
DESIGN AND FABRICATION OF A FLIGHT CONCEPT PROTOTYPE VAPOR DIFFUSION WATER RECLAMATION SYSTEM

Henry J. Kolnsberg and Donald R. McCann Aug. 1971 169 p refs (Contract NAS1-8943) (NASA-CR-111932; SVHSER-5903) Avail: NTIS CSCL 13B

The design, fabrication and test of an experimental vapor diffusion urine water reclamation system are reported. It utilized a

polyvinyl chloride membrane and achieved better than 95% recovery efficiency during a 90 day continuous test. The system also incorporated features that exercised microbiological control over the product water. Author

N71-33401*# Yale Univ., New Haven, Conn. School of Medicine.
A MATHEMATICAL MODEL OF PHYSIOLOGICAL TEMPERATURE REGULATION IN MAN

J. A. J. Stolwijk Washington NASA Aug. 1971 81 p refs (Contract NAS9-9531) (NASA-CR-1855) Avail: NTIS CSCL 06P

A dynamic mathematical model is presented of physiological regulation of body temperature in man. A total of 25 nodes is used to represent the thermal characteristics of the body, with four nodes each representing the head, trunk, arms, hands, legs and feet. The twenty-fifth node represents the central blood. Each node has the appropriate metabolic heat production, convective heat exchange with the central blood compartments, and conductive heat exchange with adjacent compartments. The outer nodes represent the skin and exchange heat with the environment via radiation, convection and evaporation. In the model the thermoregulatory system receives temperature signals from all compartments and after integration and processing the system causes appropriate commands to be sent to all appropriate compartments changing metabolic heat production, blood flow or the rate of sweat secretion. The model is presented in the form of a documented FORTRAN program. Simulations of experimental exposures to step changes in environmental temperature at rest and of 30 minute exercise bouts at 25, 50 and 75 percent of maximum aerobic capacity at different ambient temperatures are compared with actual results. Author

N71-33437*# Baylor Univ., Houston, Tex. College of Medicine.
PERIODICITY OF HIGH-ORDER FUNCTIONS IN THE CNS Final Progress Report, Year Ending 30 Jun. 1971

Peter Kellaway, Robert P. Borda, Alfred C. Coats, and James D. Frost, Jr. 30 Jun. 1971 35 p refs Prepared in cooperation with the Methodist Hospital, Houston, Tex. (Grant NGR-44-003-001) (NASA-CR-121409) Avail: NTIS CSCL 06P

The origin and physiological significance of cerebral slow potentials are investigated. The elucidation of the origin of the contingent negative variation, a slow potential which appears to be related specifically to the mechanisms underlying attention and alertness in humans, was emphasized. The investigations were carried out using monkeys as subjects. E.H.W.

N71-33451# Joint Publications Research Service, Washington, D.C.

SPACE BIOLOGY AND MEDICINE, VOLUME 5, NO. 3, 1971
12 Aug. 1971 150 p refs Transl. into ENGLISH of the publ. 'Kosmicheskaya Biologiya i Meditsina' Moscow, Med. Publishing House, 1971 p 1-92 (JPRS-53801) Avail: NTIS

Research papers on aerospace medical and biological problems of prolonged manned space flights are presented. Topics center on long term physiological effects on the human body caused by confinement in a space capsule and the evaluation of ecological life support system components.

N71-33452# Joint Publications Research Service, Washington, D.C.

MAN'S PERFORMANCE DURING WEIGHTLESSNESS
A. A. Korobova et al. In *its Space Biol. and Med.*, Vol. 5, No. 3,

1971 12 Aug. 1971 p 1-14 refs

Avail: NTIS

Reviewed are studies on the coordination of movements as functions of the osteomuscular system and overall performance during the weightless state. Considered is the nature of impairments in coordination of bodily movements, change in the motor function under lunar gravitational conditions, adaptation to simulated and natural weightlessness conditions, and the role of physical exercises in adaptation to weightlessness. It is concluded that data in the literature on studies of the human motor functions in model experiments and during natural weightlessness of different durations indicate a change in performance and a definite pattern of timing and strength in the execution of movements. G.G.

N71-33453# Joint Publications Research Service, Washington, D.C.

EFFECT OF PROLONGED HYPOKINESIA ON SEROTONIN METABOLISM IN RATS

Z. S. Dolgun et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 15-21 refs

Avail: NTIS

A study was made on the effect of prolonged hypokinesia on serotonin (5-HT) metabolism in rats. It was found that motor activity restriction causes substantial 5-HT metabolism shifts. The most marked deviations from normalcy in the 5-HT content in the duodenal blood and tissues, and also in the excretion of the metabolite of 5-HT 5-hydroxyindolylacetic acid (5-HIAA) in the urine, were observed on the first-third and thirteenth-fifteenth days of hypokinesia. Prolonged (more than 60 days) hypokinesia leads to a considerable increase in the blood 5-HT content; on the 30th and 45th days after emergence from hypokinesia the blood 5-HT content remains high. Author

N71-33454# Joint Publications Research Service, Washington, D.C.

CORRELATION AMONG THE INDICES OF GENERAL AND TISSUE RESISTANCE IN RATS (DURING MUSCLE TRAINING, ADAPTATION TO THE COLD AND DIBASOL INJECTIONS)

V. Ya. Rusin *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 22-27 refs

Avail: NTIS

It was established in experiments on 225 adult white rats that an increase in resistivity of the intact organism to different unfavorable factors under the influence of muscular training, adaptation to the cold, and dibasol injections has a reliable correlation with the increase in resistance at the tissue and cell levels. It therefore follows that by applying methodologically extremely simple tissue and cell resistance criteria one can check the means and methods for increasing body biological reserves. Author

N71-33455# Joint Publications Research Service, Washington, D.C.

CULTIVATION OF MAMMAL CELLS AT 'SUBOPTIMUM' TEMPERATURES

F. V. Sushkov et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 28-32 refs

Avail: NTIS

Cultures of L. HeLa, and VNK-21 cells, A-1, FL, RH human amnion and kidney cells, and Chinese hamster cells of sublines 237 and 431 were cultivated at temperatures of 37 and 36-28 C with an interval of 2 + or - 0.5 C. L. A-1, BHK-21 cells and Chinese hamster cells were found to be capable of mitotic division

at 30 and 28 C. Proliferation of L cells was maintained for 19 months (42 subinoculations); other cell lines tolerated two or three subinoculations (20-30 days) under these conditions. The adaptation of L cells involved substantial cytophysiological changes which reflected the adaptation process, which is obviously phenotypical.

Author

N71-33456# Joint Publications Research Service, Washington, D.C.

SPINAL CORD REFLEX ACTIVITY IN NORMAL AND LABYRINTHECTOMIZED ANIMALS UNDER THE INFLUENCE OF RADIAL ACCELERATIONS

G. S. Ayzikov et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 33-39 refs

Avail: NTIS

A study was made of spinal cord induced potentials (H-reflex) in intact and labyrinthectomized rats at accelerations of 0.5-8 g in a head-pelvis direction. The combined effect of accelerations in the range from 0.5 to 8 g considerably changed spinal cord reflex activity. At 0.5 g the H-reflex increased in amplitude and returned to the background values after rotation ceased. At 2, 4 and 8 g the reflex was suppressed in direct proportion to the acceleration. The time for reflex restoration also increased with an increase in acceleration. During accelerations the functional state and activity of the motor analyzer were determined by a combination of factors. In labyrinthectomized animals the depression of spinal activity manifested a muscle dependence of the exposure. Author

N71-33457# Joint Publications Research Service, Washington, D.C.

EFFECT OF ABDOMINAL OR HEAD REGION SHIELDING DURING GAMMA IRRADIATION OF DOGS ON THE CONTENT OF BLOOD SERUM PROTEIN FRACTIONS

B. I. Davydov et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 40-45 refs

Avail: NTIS

Dogs were exposed to gamma-irradiation in a dose of 600 R with shielding of the abdominal (dose behind shield 150 and 300 R) or head (dose behind shield 150 R) regions. Protein fractions in the blood serum were determined by the paper electrophoresis method. A decrease in the albumin-globulin coefficient was noted regardless of shield localization: there was an increase in the content of beta-globulins with normalization by the 100th day in the case of abdominal shielding and a residual dose behind the shield of 150 R and an increase in the albumin-globulin coefficient, for the most part due to the alpha sub 2 fraction. The increase in globulins correlates with an increase in glutamate-aspartate transferases. Author

N71-33458# Joint Publications Research Service, Washington, D.C.

IMPORTANCE OF THE MOTOR AND VESTIBULAR ANALYZERS AND FRONTAL HYPOTHALAMUS IN COMPENSATING A GRAVITATIONAL LOAD DURING ORTHOSTASIS

G. S. Belkaniya *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 46-53 refs

Avail: NTIS

In experiments on intact cats and also against a background of curarization, bilateral vestibular deafferentation and electrocoagulation of the frontal hypothalamus, it was possible to determine the phase nature of changes in respiration, arterial pressure and cerebral bioelectric activity during orthostasis. There is a distinct dependence between the rate of development of orthostatic collapse and the nature of the primary vascular reaction;

this determines its prognostic importance. Elimination of the vestibular motor analyzer and electric coagulation of the frontal hypothalamus sharply reduce the gravitational function during orthostasis. Orthostatic tolerance is regarded as a special manifestation of the general mechanism of body spatial orientation.

Author

N71-33459# Joint Publications Research Service, Washington, D.C.

FORMULATION OF PHYSIOLOGICAL PRINCIPLES FOR RATIONAL HEAT TRANSFER IN INDIVIDUAL INSULATING GEAR

S. M. Gorodinskiy *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 54-62 refs

Avail: NTIS

Experimental data are given on validating the physiological principles for approach to heat transfer in an individual insulating suit. The body regions from which the most effective heat transfer can be ensured because of their anatomical-physiological characteristics were determined. The undesirability of heat transfer primarily from body regions situated over the main muscle groups of the extremities is noted; this is true because the conditions for heat removal from them are less favorable than from the sectors situated over tendons and poorly expressed muscle layers; the possibility of local overcooling of the muscles can lead to a decrease in their performance.

Author

N71-33460# Joint Publications Research Service, Washington, D.C.

USE OF COLOR-MUSIC IN AN OPERATOR'S WORK DURING ISOLATION

Yu. A. Petrov et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 63-68 refs

Avail: NTIS

In order to prevent possible impairments in the psychophysiological sphere of an operator during prolonged isolation provisions must be made for a special organization of the interior. Color-musical compositions are an element of this interior. The timeliness of the use of color and music for this purpose is considered and the principles for selecting color and musical programs are defined.

Author

N71-33461# Joint Publications Research Service, Washington, D.C.

MODELS OF A MAN-OPERATOR IN INVESTIGATING SPACESHIP MANUAL CONTROL

R. V. Komotskiy et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 69-76 refs

Avail: NTIS

The possibility and feasibility of replacing a man-operator with an appropriate model is discussed and current models in accordance with the main classes of operator's activity are considered. Mathematical descriptions of models and instructions on how to use models in studying manual operation of a spacecraft are provided.

Author

N71-33462# Joint Publications Research Service, Washington, D.C.

CYTOGENETIC INVESTIGATIONS IN RELATION TO MANNED SPACE FLIGHT

L. P. Grinio et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 77-83 refs

Avail: NTIS

No increase in chromosomal aberrations was found in the blood of test subjects during a 120 day bed rest experiment. No significant changes in the chromosomal apparatus were detected in cytogenetic examinations of a cosmonaut. These findings indicate that manned space flights made along the trajectories and in radiation environments involved up to this time are genetically safe.

Author

N71-33463# Joint Publications Research Service, Washington, D.C.

CHANGES IN HUMAN RETINAL CIRCULATION DURING TRANSVERSE ACCELERATION

A. S. Barar et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 84-90 refs

Avail: NTIS

Data obtained using a teleophthalmoscopic system give evidence that the blood filling of retinal vessels decreases in response to accelerations of 6 and 8 g. Exposure to 10 and 12 g disturbs blood flow continuity in retinal vessels, giving rise to optical disturbances. These phenomena may be accounted for by changes in systemic and regional circulation. Their level is correlated with the values of the acceleration components coinciding with the direction of the vascular bed. In the pathogenesis of the described vascular disturbances an increase in hydrostatic pressure in the region of the eye back pole is of a certain significance.

Author

N71-33464# Joint Publications Research Service, Washington, D.C.

CHARACTERISTICS OF THE NASAL VASCULAR SYSTEM REACTION DURING 120-DAY HYPOKINESIA

I. Ya. Yakovleva *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 91-97 refs

Avail: NTIS

During a 120 day bedrest experiment the dynamics of intranasal circulation was investigated by the rhinopneumometric technique. Each test subject exhibited changes in nasal circulation from the third to the twelfth day of hypokinesia. The responses varied from subject to subject but for the most part were similar, involving an increase in the blood filling of the nasal conchae and vasomotor innervation liability. The changes were more pronounced in cases of autonomic and vascular dysfunction. Drugs produced no distinct effect on nasal circulation responses. Hemodynamic disturbances of the nasal mucosa were due to changes in hydrostatic blood pressure, followed by neuroendocrinal shifts.

Author

N71-33465# Joint Publications Research Service, Washington, D.C.

ELECTRIC ACTIVITY OF LEG MUSCLES DURING STANDING AFTER A 120-DAY BEDREST CONFINEMENT

B. N. Petukhov et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 98-104 refs

Avail: NTIS

Changes in the electromyograms (EMG) of 10 healthy subjects were studied following a 120 day bedrest experiment. The test subjects were classified into three groups: the first, a control group, included four persons; the second and third groups included three men each. The second group of test subjects received pituitrin and DOCA to prevent changes in water and mineral metabolism. The test subjects in the third group were given Nerabol to prevent deviations in protein metabolism. After the hypokinesia the EMG

amplitude exhibited a distinct decrease in the test subjects of the first and third groups and a less marked decrease in the second group of test subjects. Author

N71-33466# Joint Publications Research Service, Washington, D.C.

CHANGE IN CARDIAC EJECTION UNDER THE INFLUENCE OF 15-DAY BED CONFINEMENT

B. S. Katkovskiy et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 105-113 refs

Avail: NTIS

A significant increase in cardiac output related mainly to stroke volume was observed in five male test subjects during a 15 day bedrest experiment. Oxygen consumption and carbon dioxide production decreased gradually during the observation period. It is suggested that similar changes in cardiac output occur in an early period of adaptation to weightlessness during spaceflight. Author

N71-33467# Joint Publications Research Service, Washington, D.C.

CORRELATION BETWEEN RENAL EXCRETION OF DIFFERENT CATIONS UNDER CONDITIONS OF AN IMPAIRED MINERAL BALANCE

I. S. Balakhovskiy et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 114-118 refs

Avail: NTIS

Human subjects were investigated to clarify the interrelationship between renal elimination of sodium and calcium in order to make a more thorough analysis of changes in electrolyte balance during space flight. A broad range of changes in the state of water-mineral metabolism was attributed to prolonged exposure at high temperature and restricted mobility. Author

N71-33468# Joint Publications Research Service, Washington, D.C.

AMINOSILICAGELS: REGENERABLE SORBENTS FOR ABSORBING CARBON HYDROGEN SULFIDE AND WATER VAPOR

I. A. Danilychev et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 119-122 refs

Avail: NTIS

Amino silica gels were synthesized and tested for their absorption effectiveness in spacecraft atmospheric purification systems. Sorption characteristics with carbon dioxide, hydrogen sulfide, and other substances of acid nature provided optimal regeneration capacities for atmospheres in pressurized cabins and also in a number of industrial branches. G.G.

N71-33469# Joint Publications Research Service, Washington, D.C.

NATURE AND DISTRIBUTION OF INTRAOCULAR PRESSURE IN HEALTHY PERSONS AGES 25-40 ENGAGED IN MENTAL WORK

T. A. Petrov et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 123-126 refs

Avail: NTIS

The detection of latent pathology in humans by intraocular pressure measurements was investigated. Tonometric measurements on 25 to 40 year old subjects engaged in mental work showed that intraocular pressure in itself can be evidence of the degree of probability of disease but is not an absolute criterion of normalcy or a pathological condition. Analysis of obtained intraocular pressure distribution curves established an isolated group of individuals whose indices exceeded a normal distribution range. Author

N71-33470# Joint Publications Research Service, Washington, D.C.

MORPHOLOGICAL CHANGES IN MYOCARDIUM DURING MULTIHOUR ACCELERATIONS

P. I. Katunyan et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 127-129 refs

Avail: NTIS

The results of a study on a series of histological, histochemical and electron microscope manifestations of myocardial reactions under the influence of + 2G sub Z accelerations are reported. Observed are the hearts of 36 male rats weighing 200-250 g which were exposed to + 2G sub Z accelerations for periods of 8, 16, and 24 hours on a centrifuge with a 70 cm arm and also studied are the aftereffects 24 and 72 hours after the centrifuge was stopped. A well expressed dependence of dystrophic myocardial damage on acceleration duration is established. Structural changes in cardiac muscle cells and increased capillary permeability observed after continuous acceleration exposure for 24 hrs are indications of dystrophic damage to the myocardium resulting from impaired hemodynamics. Author

N71-33471# Joint Publications Research Service, Washington, D.C.

OPTIMIZATION OF THE MINERAL COMPOSITION OF A NUTRIENT MEDIUM FOR HYDROGENOMONAS

V. K. Kovalenkova et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 130-132 refs

Avail: NTIS

The efficiency of autotrophic cultivation of *Hydrogenomonas* in a modified Schlegel nutrient was studied by comparing increment biomass weight with that obtained for pure Schlegel cultivations. Culture density levels in media where NH_4Cl was replaced by urea increased markedly when nutrient salt concentration was reduced sixfold. G.G.

N71-33472# Joint Publications Research Service, Washington, D.C.

RESULTS OF COMBINED EXPOSURE OF CHLORELLA TO VIBRATION AND GAMMA IRRADIATION

I. D. Anikeyeva et al *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 133-136 refs

Avail: NTIS

An attempt was made to evaluate the possible effects exerted by mechanical vibration and vibration in combination with gamma irradiation on the unicellular green alga *Chlorella vulgaris*, a proposed component of closed ecological systems. Experiments show that there are no appreciable differences in the rate of cell development and the nature of sporulation detectable either in the case of acute or chronic irradiation. Vibration in itself exerted no significant effect, nor did it in combination with irradiation. Author

N71-33473# Joint Publications Research Service, Washington, D.C.

ONE PROPERTY OF THE OVERALL CHARACTERISTICS OF VESTIBULAR NYSTAGMUS

A. A. Shipov *In its Space Biol. and Med.*, Vol. 5, No. 3, 1971 12 Aug. 1971 p 137-140 refs

Avail: NTIS

Experiment on male guinea pigs were performed to determine nystagmic reactions to angular accelerations of increased intensity and lengths. It was demonstrated that the number of beats, duration and frequency of nystagmus in animals exposed to angular accelerations successively increasing in intensity increased with an increase in acceleration intensity. The nystagmic reaction to each of the used accelerations was less than for animals subjected to a single investigation during rotation with acceleration of a particular intensity.

Author

N71-33486# Battelle-Northwest, Richland, Wash.

VARIOUS HOLOGRAPHIC SCANNING CONFIGURATIONS FOR UNDER SODIUM VIEWING

H. Dale Collins Mar. 1971 45 p refs

(Contract AT(45-1)-1830)

(BNWL-1558) Avail: NTIS

Various holographic scanning configurations were investigated that could be used for acoustic imaging in liquid sodium. Different scanning configurations were analyzed and experiments were performed to verify the unique properties of each configuration. A general analysis is presented of acoustical scanned holography with phase-shifting the electronic reference beam, and various scanning configurations are composed for viewing in liquid sodium. The optimum holographic imaging configuration in liquid sodium consists of scanning either a focused or point source and receiver transducer and phase shifting the electronic reference. The optimum frequency used for illumination is determined by the required resolution and range of the imaging system.

Author

N71-33501# Joint Publications Research Service, Washington, D.C.

BIOGEOCENOLOGY TODAY AND TOMORROW

3 Aug. 1971 34 p refs Transl. into ENGLISH of various articles from Priroda (Moscow), no. 6, 1971 p 4-13

(JPRS-53743) Avail: NTIS

CONTENTS:

1. CURRENT TASKS OF BIOGEOCENOLOGY Ye. M. Lavrenko p 2-6 refs

2. POPULATION STRUCTURE OF BIOGEOCENOSES S. S. Svarts p 7-10

3. STATION INVESTIGATIONS OF TUNDRA BIOGEOCENOSES B. A. Tikhomirov p 11-12

4. FROM DOKUCHAYEV'S NATURAL ZONES TO SPACE ECOSYSTEMS O. G. Gazenko et al p 13-14

5. EXPERIMENTAL BIOGEOCENOLOGY A. N. Tyuryukanov p 15-16

6. MICROBIC CENOSES AND FERTILITY Ye. N. Mishustin p 17-18

7. BIOGEOCENOLOGY AND WATER TREATMENT M. M. Kamshilov p 19

8. THE STRUCTURE AND FUNCTION OF BIOGEOCENOSES N. V. Dylis p 20-22

9. PHOTOSYNTHESIS AND THE PRODUCTIVITY OF CENOSES A. A. Nichiporovich p 23-25

10. BIOGEOCENOLOGY OF THE WATER ENVIRONMENT G. G. Vinberg p 26-27

11. ENERGY BALANCE OF A BIOGEOCENOSIS A. A. Molchanov p 28-30

12. IMPORTANCE OF BIOGEOCENOLOGY IN LAND RECLAMATION N. I. Pyavchenko p 31-32

N71-33502# Joint Publications Research Service, Washington, D.C.

CURRENT TASKS OF BIOGEOCENOLOGY

Ye. M. Lavrenko *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 2-6 refs

Avail: NTIS

Russian activities in the field of biogeocenoses are discussed. The study of the structure of biogeocenoses, the trophic (food) relations among their living components, and metabolic processes in biogeocenoses, including biological productivity, is the specific nature of biogeocenological research. The physical structure of biogeocenoses and the interrelations among their components are discussed.

Author

N71-33503# Joint Publications Research Service, Washington, D.C.

POPULATION STRUCTURE OF BIOGEOCENOSES

S. S. Svarts *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 7-10

Avail: NTIS

Approaches to biogeocenotic research are discussed. Two approaches are proposed. The first is to study a specific cenosis in all aspects of its internal dynamic organization and external ties. The second is to investigate the most important biogeocenotic processes and phenomena, whose aggregate ultimately determines the laws of life of the biosphere.

Author

N71-33504# Joint Publications Research Service, Washington, D.C.

STATION INVESTIGATIONS OF TUNDRA BIOGEOCENOSES

B. A. Tikhomirov *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 11-12

Avail: NTIS

Station investigations of tundra biogeocenoses are discussed. Expansion of station research and the setting up of a number of experiments in the tundra are prerequisites for successful management of the tundra, for rational use of resources, and for increasing productivity.

Author

N71-33505# Joint Publications Research Service, Washington, D.C.

FROM DOKUCHAYEV'S NATURAL ZONES TO SPACE ECOSYSTEMS

O. G. Gazenko et al *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 13-14

Avail: NTIS

Applications of the theory of natural zones and space ecosystems are presented. Biogeocenology originated with the Russian study of soil science and creation of the scientific disciplines of geographic and genetic soil science.

Author

N71-33506# Joint Publications Research Service, Washington, D.C.

EXPERIMENTAL BIOGEOCENOLOGY

A. N. Tyuryukanov *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 15-16

Avail: NTIS

The use of radioisotopes for observing changes in the structure or turnover of substances in biogeocenoses is discussed. Tracer atoms have made it possible to obtain results such as: (1) determination of the nature of chemical and biochemical ties in biogeocenoses, (2) the study of the effect of radioisotopes on organisms, and (3) determination of the coefficients of accumulation by organisms of various elements. Author

N71-33507# Joint Publications Research Service, Washington, D.C.

MICROBIC CENOSSES AND FERTILITY

Ye. N. Mishustin *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 17-18

Avail: NTIS

The role of microbes in biogeocenoses is discussed. The effects of microbes on the fertility of the soil are examined. Various aspects of soil science which will produce increased fertility are described. Author

N71-33508# Joint Publications Research Service, Washington, D.C.

BIOGEOCENOLOGY AND WATER TREATMENT

M. M. Kamshilov *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 19

Avail: NTIS

The application of biogeocenology to the problem of water pollution is discussed. The self-cleaning capability of the Volga river is described and the influences of various chemicals and organisms on water cleanliness are reported. Author

N71-33509# Joint Publications Research Service, Washington, D.C.

THE STRUCTURE AND FUNCTION OF BIOGEOCENOSSES

N. V. Dylis *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 20-22

Avail: NTIS

The structure and function of biogeocenoses are presented. The role of individual components of a biogeocenosis in the organization of its structure and functions is not uniform and is specific. Changes in the autotrophic link of a system and the resulting effects are described. Author

N71-33510# Joint Publications Research Service, Washington, D.C.

PHOTOSYNTHESIS AND THE PRODUCTIVITY OF CENOSSES

A. A. Nichiporovich *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 23-25

Avail: NTIS

The process of photosynthesis and its relation to the production of cenoses is discussed. The process of the formation of the primary organic product is the initial stage in the life activity of any biogeocenosis. This stage is subject to complex special laws that require special study and special regulatory steps. Author

N71-33511# Joint Publications Research Service, Washington, D.C.

BIOGEOCENOLOGY OF THE WATER ENVIRONMENT

G. G. Vinberg *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 26-27

Avail: NTIS

The biogeocenology of the water environment is discussed. Water systems are distinguished from terricolous systems by the fact that there are dozens and hundreds of times more animals in the water environment than on land. Determination of the primary product is the first task of water biogeocenology. Author

N71-33512# Joint Publications Research Service, Washington, D.C.

ENERGY BALANCE OF A BIOGEOCENOSIS

A. A. Molchanov *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 28-30

Avail: NTIS

The effect of solar radiation and its utilization on the potential biological productivity of various terricolous biogeocenoses is discussed. The flow of solar energy with short wave and long wave radiation is reflected from a biogeocenosis, absorbed or transmitted, converted, and finally returned to space. Author

N71-33513# Joint Publications Research Service, Washington, D.C.

IMPORTANCE OF BIOGEOCENOLOGY IN LAND RECLAMATION

N. I. Pyavchenko *In its Biogeocenology Today and Tomorrow* 3 Aug. 1971 p 31-32

Avail: NTIS

The application of biogeocenology principles to land reclamation operations is discussed. Marsh biogeocenoses belong to a special type of the biosphere's accumulating systems. They are very important accumulators of and storehouses for the tremendous reserves of connected bodies of water. Author

N71-33577# South Dakota Univ., Vermillion. Dept. of Biochemistry.

EFFECTS OF ULTRAVIOLET RADIATION ON ALGAE: MECHANISMS OF INACTIVATION AND REPAIR Annual Progress Report, 1 May 1970-30 Apr. 1971

Gary D. Small 1971 4 p refs

(Contract AT(11-1)-1793)

(COO-793-5) Avail: NTIS

A photoreactivating enzyme was detected in *Chlamydomonas reinhardtii* and *Euglena gracilis* using the *Hemophilus influenzae* transformation assay. Photoreactivating enzyme activity was found in extracts of chloroplasts isolated from *Euglena*. Studies on detection of ultraviolet-induced photoproducts in DNA of algae included development of a method for isolating pyrimidine dimers from enzymic digests of irradiated P-32 labeled DNA. A DNase with a high specificity toward single-stranded DNA was purified for studies on enzymes that may have a role in repair and replication of DNA. NSA

N71-33718*# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

COLD SEA SURVIVAL

James H. Veghte Oct. 1970 26 p refs

(NASA Order MIPR-T-80489)

(NASA-CR-121449; AD-716389; AMRL-TR-70-72) Avail: NTIS CSCL 06K

Two three-man prototype liferafts were evaluated in Arctic waters off Kodiak Island, Alaska. Surface and core temperatures of each subject were monitored continuously during the 22 hour exposure in the TUL raft and 6 hour exposure in the P-B raft. Each subject wore a different clothing assembly: a NASA full pressure suit, the NASA flight clothing, and the Air Force anti-exposure suit. None of the clothing assemblies was considered adequate to maintain a person in comfort. No significant biochemical shifts in the blood or urine were found. General tolerance times for a variety of cold water-raft exposure are depicted graphically. Author

N71-33722# Institute for Sensory Physiology RVO-TNO, Soesterberg (Netherlands).

PSYCHOPHYSICAL MEASURES OF SENSORY SENSITIVITY [PSYCHOFYSISCHE MATEN VOOR SENSORISCHE GEVOELIGHEID]

W. H. Janssen 1971 26 p refs In DUTCH; ENGLISH summary (IZF-1971-13; TDCK-58082) Avail: NTIS

It is shown that measures and procedures based on the threshold idea are not satisfactory. Newer measures have not been elaborated sufficiently to be able to use them with confidence. Determining signal detection theory parameters by means of confidence ratings is the preferable procedure, since a reliable technique of estimation has been developed for estimating parameters from data of this type. Yes-no and forced choice procedures of measurement are inadequate. Author

N71-33725# Institute for Sensory Physiology RVO-TNO, Soesterberg (Netherlands).

VISUAL TROUBLES, DUST PROOF AND ACOUSTIC QUALITIES AS THEY ARE MET WITH PERFORATED WALL COVERING [VISUELE HINDER, STOFWERING EN AKOESTISCHE EIGENSCHAPPEN BIJ HET GEBRUIK VAN GEPEFOREERDE WANDEBEEKLEDING]

H. J. Leebeek and H. J. M. Steeneken 1971 9 p In DUTCH; ENGLISH summary (IZF-1971-12; TDCK-57972) Avail: NTIS

A work situation in a test-cell is described, in which wall covering with a certain acoustic quality is required. The great number of deep holes in the perforated covering causes visual problems for the workers. An explanation of the phenomenon is given as well as means of improvement. A very dark paint would cause less trouble but best solution is the use of thin metal sheet instead of 10 mm plaster material. Author

N71-33775# General Electric Co., Philadelphia, Pa. Space Div. **RESEARCH ON AVALANCHE TYPE SEMICONDUCTOR RADIATION DETECTORS** Semiannual Report, Jul. - Dec. 1970

Philip J. Moldofsky and Peter V. Hewka Jan. 1971 86 p refs (Contract AT(30-1)-3246)

(NYO-3246-TA-8) Avail: NTIS

Two arrays of three detectors each have been constructed. Each three-detector probe has a detector frontal area of 3 sq cm. In addition, with the detectors arranged as a triangular prism, overall efficiency is increased due to a greater total active detector thickness. Angular dependence of sensitivity is also greatly reduced with this array, making possible a more accurate interpretation of measured count rates in terms of actual interpretation of measured count rates in terms of actual activity of isotope present in an unknown source-detector geometry. Preliminary results show that noise reductions of a factor of 30 are attainable with special voltage sensitive amplifiers, using pulse clipping techniques. Author (NSA)

N71-33823# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

SPECTRAL SENSITIVITY OF MACAQUE CONES DETERMINED WITH AN ERG METHOD

D. van Norren and P. Padmos 1971 16 p refs (IZF-1971-10; TDCK-57935) Avail: NTIS

The spectral sensitivity of macaque monkeys was determined by flicker-electroretinography. Strong colored backgrounds were applied to bleach away one or two of the three fundamental cone systems. With a strong yellow background a blue sensitive system could be isolated. This system is more sensitive to longer wavelengths compared to the human blue system. A deep red background suppresses the red system. Thus the spectral sensitivity of the green sensitive system could be derived. Strong blue backgrounds were less selective in suppressing the blue and green system so that no definite conclusions about the shape of the red system could be drawn. Some theoretical considerations on the method of selective adaptation are given. Author

N71-33859# Institute for Perception RVO-TNO, Soesterberg (Netherlands).

PSYCHOPHYSICAL EVIDENCE FOR LATERAL INHIBITION IN HEARING

T. Houtgast 1971 35 p refs (IZF-1971-8; TDCK-57803) Avail: NTIS

Although there are some indications of the possible role of lateral inhibition in hearing, there has been no clear demonstration of it in psychophysical experiments. Either the phenomenon plays only a minor role, or it has escaped psychophysical verification. Accepting for a moment the second possibility it is argued that the threshold of a test-tone presented simultaneously with a masker does not reflect clear lateral inhibition effects since the inhibition affects both the test tone and the masker. Two different methods, in which the test tone and the masker were presented successively, give clear psychophysical evidence of lateral inhibition in hearing. First, the threshold curve of short test tone bursts presented in the gaps between repeated masker bursts (noise with a steep negative or positive gradient at a particular frequency) show marked edge effects. Secondly, the results of psychophysical measurements on two tone suppression indicate that the nervous activity due to one frequency component may be suppressed by another component. The effect at the edges of the frequency spectrum are comparable with visual Mach bands, and the interaction of two tones is suggestive of the two tone inhibition found in auditory nerve fibers. Author

N71-33934# Institute for Cancer Research, Philadelphia, Pa. **STUDIES OF THE EFFECTS OF ULTRAVIOLET RADIATION ON CELL STRUCTURE AND BEHAVIOR** Comprehensive Report, 1967 - 1970

Jerome J. Freed 25 Jan. 1971 11 p refs

(Contract AT(30-1)-2356)

(NYO-2356-43) Avail: NTIS

Radiation studies were continued on cell behavior in relation to underlying cytoplasmic structure and differential activity of genes. For studies on microtubules as determinants of cell behavior, phase contrast time lapse and electron microscopy were used and a flying spot microscope was developed. Studies on the effects of colchicine on saltatory movement in cells showed that these movements were associated with an aster-like array of cytoplasmic microtubules. Other studies were conducted on amino acid deprivation as a source of chromosome aberrations. Haploid cells of frogs were used for transfer of nuclei from monolayer cultured cells to enucleated eggs to determine effects of variant nuclei in embryonic development. NSA

N71-33970# Deutsche Gesellschaft fuer Luft- und Raumfahrt, Meckenheim (West Germany).

ANTHROPOTECHNOLOGY [ANTHROPOTECHNIK]

H. Dupuis, S. Fichtbauer, G. W. Radl, and H. L. Vogt Apr. 1970
101 p refs In GERMAN; ENGLISH summary Presented at 8th
Session of the WGLR Comm. for Anthropotechnol., Munich, 28
Nov. 1969

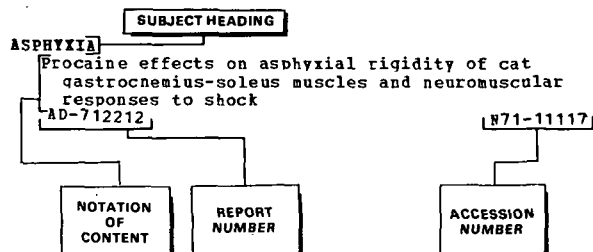
(DLR-Mitt-70-11) Avail: NTIS; ZLDI Munich: 21,20 DM

Four papers dealing with the measurement of human psychic and physical stress are reported as the results of an extensive experimental program to determine the influence of vibrations on the human body. A survey on the role of parallel tasks in determining psychic stress which includes a list of convenient references is given. Some basic experimental problems and different methods e.g. task-analysis-techniques, applications of control theories, psycho-physiological data recording, perceptual psychology-methods and the use of rating scales are outlined together with the use of electrophysiological methods in these fields. Author

Subject Index

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 95) NOVEMBER 1971

Typical Subject Index Listing



The Notation of Content (NOC), rather than the title of the document, is used to provide a more exact description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

ABDOMEN

Small pressure wave transmission in abdominal venae cavae of dogs in mathematical model development for viscoelastic behavior of large veins

A71-38987

ABSTRACTS

Cross-referenced directory of reports of Human Engineering Laboratories 1953 to 1970

N71-31617

ACCELERATION (PHYSICS)

Stop test method to study acceleration in movement control processes in man, considering elbow joint movements in normal and pathological tremors in Parkinson disease afflicted subjects

A71-37569

ACCELERATION STRESSES (PHYSIOLOGY)

H reflex changes in spinal marrow of intact and labyrinthectomized rats under radial accelerations

A71-39221

Human retinal blood circulation changes and vision disturbance under transversely directed acceleration, using dark chamber teleophthalmoscopy

A71-39228

Myocardium reactions under 2G acceleration from histological, histochemical and electron microscopic observations on rats, noting dystrophic damage level relationship to duration

A71-39235

Stroke number and vestibular nystagmus duration and frequency under successively increasing angular acceleration from tests on guinea pigs

A71-39238

Radial acceleration effects on spinal cord induced potentials of intact and labyrinthectomized rats

N71-33456

Dystrophic myocardial damage in rat hearts caused by prolonged acceleration

N71-33470

ACCELERATION TOLERANCE

Evidence for test of dynamic otolith function considered in relation to responses from patient with idiopathic progressive vestibular degeneration

N71-31768

Pilot injuries on high speed low altitude flight noting acceleration due to gust effects

N71-31888

Mechanical responses of human head subjected to acceleration loads determined for use in construction of artificial head

N71-32547

ACID BASE EQUILIBRIUM

Respiratory chemoreceptors and acid-base alterations effects on adrenocortical activation during hypoxia in dogs

A71-38986

ACOUSTIC MEASUREMENTS

UH-1P helicopter acoustic measurements during gunfire and rocket firing including bioacoustic factors

[AD-713830]

N71-31613

ACOUSTIC SIMULATION

Kinematic analysis and simulation of transmission modes of sound energy through middle ear

A71-38062

Human reactions to sleep deprivation by simulated sonic booms

[ISVR-TR-41]

N71-32865

ACTIVATION (BIOLOGY)

Activation impulse blocking in nerve, using inhomogeneous Lillie electrochemical model

A71-37282

ACTIVITY (BIOLOGY)

Activity correlation of adjacent neurons of cat cerebral cortex somatosensory zone, considering distribution of same direction /cophase/ and different direction /counterphase/ of background rhythms

A71-37392

Development of analog model of neuron adaptation and simulation of spontaneous activity of neuron network

[JPRS-53597]

N71-32032

Characteristics of water environment and relationship to biogeocenology

N71-33511

Effect of solar radiation on energy balance of biogeocenosis

N71-33512

Application of biogeocenology principles to land reclamation activities

N71-33513

ACTIVITY CYCLES (BIOLOGY)

Interdisciplinary cycle research - Conference, Noordwijk, Netherlands, June 1970

A71-39474

Biological and biochemical cyclic phenomena, including circadian rhythms

A71-39475

ADENOSINE TRIPHOSPHATE (ATP)

Phosphoenolpyruvate as enzyme inhibitor of phosphoribulokinase in Pseudomonas facilis with respect to ribulose-5-phosphate and ATP

A71-38820

ADIPOSE TISSUES

Potassium concentrations and osmolality levels changes effects on vascular resistance in subcutaneous adipose tissue blood flow

A71-39379

ADRENAL METABOLISM

Respiratory chemoreceptors and acid-base alterations effects on adrenocortical activation during hypoxia in dogs

A71-38986

ADRENERGICS

Canine ventricular myocardium as cardiac beta-adrenergic receptor, describing binding of norepinephrine to microsomal particles

A71-37900

AEROBES

Bacterial spore distribution and dry heat resistance on Mariner-Mars 1969 spacecraft,

AEROSOLS

using randomly selected aerobic mesophilic isolates

A71-37646

AEROSOLS

Atmospheric circulation and aerosol pollution transport noting role of temperature inversions [IPA-RDP-36]

N71-32863

AEROSPACE ENVIRONMENTS

Space station biological/medical laboratories, discussing physiology, pathology, hematological, static and dynamic equilibrium, neuropsychic, dietetic, radiobiological, hygiene and prophylaxis departments

A71-37308

Human response to space environment, discussing prolonged weightlessness, extravehicular work and lunar surface activity

A71-37492

Ergonomic evaluation of flight crew working conditions from viewpoint of static and dynamic adaptation of aircraft system design to human psychophysical capabilities

A71-38016

Conference on aerospace environments, manned space flight, weightlessness simulation, musculoskeletal and cardiovascular systems, bone loss, mineral metabolism, and hematology [NASA-SP-269]

N71-33251

AEROSPACE MEDICINE

Space station biological/medical laboratories, discussing physiology, pathology, hematological, static and dynamic equilibrium, neuropsychic, dietetic, radiobiological, hygiene and prophylaxis departments

A71-37308

Determination and application of aeromedical standards to occupant selection, aircraft design features, and operational guidelines for spacecraft design [FAA-AM-71-33]

N71-32083

Research and development, weightlessness simulation, calcium metabolism, manned space flight, pressure suits, immobilization, and aerospace medicine

N71-33275

Medical and biological problems of prolonged manned space flight [JPRS-53801]

N71-33451

AFFERENT NERVOUS SYSTEMS

Primary biological receptor element analogous electronic model for potential and afferent pulse train responses to stimuli

A71-38894

AGE FACTOR

Intraocular pressure distribution of healthy mental workers in 25-40 years age range, noting symmetry

A71-39234

AIR POLLUTION

Atmospheric circulation and aerosol pollution transport noting role of temperature inversions [IPA-RDP-36]

N71-32863

AIR PURIFICATION

Amino silica gel absorbers for atmospheric purification systems of spacecraft cabins

N71-33468

AIR TRANSPORTATION

Environmental radiation exposure in air travel, comparing integral radiation dosages for conventional jet transport aircraft and SST

A71-38976

AIRCRAFT INSTRUMENTS

Ergonomic evaluation of flight crew working conditions from viewpoint of static and dynamic adaptation of aircraft system design to human psychophysical capabilities

A71-38016

AIRCRAFT NOISE

Aircraft noise effect on hearing impairment of cockpit crews in civil aviation, using audiometric evaluation

A71-38222

AIRCRAFT PILOTS

Helicopter pilot visual acuity determined from flight tests [ISVR-TR-44]

N71-31660

Anthropometric survey of aviation personnel with bivariate tables noting relationships between selected variables

SUBJECT INDEX

[AD-723796] N71-31942

Protective features and compatibility with airborne communication systems considered in study of aviation helmets

[AD-724080] N71-33123

AIRCRAFT STABILITY

Pilot injuries on high speed low altitude flight noting acceleration due to gust effects

N71-31888

ALCOHOLS

Physiological effects of two levels of alcohol on vertigo and nystagmus responses resulting from caloric irrigations with visual conditions and alertness of subjects controlled

[FAA-AM-71-6] N71-32079

Disoriented visual tracking performance of humans during angular acceleration as result of alcohol consumption

[FAA-AM-71-20] N71-32433

ALGAE

Mechanisms of inactivation and repair in determination of effects of ultraviolet radiation on algae

[COO-1793-J] N71-33577

ALKALOSIS

Alkalosis effect on human maximal performance and lactic acid formation in blood under supramaximal exercise conditions

A71-38888

ALTITUDE ACCLIMATIZATION

Physiological responses of burro *Equus asinus* to oxygen lack in mountain altitudes, studying red blood cell and plasma volumes

A71-38560

High altitude exposure effects on concentration and total quantity of electrolytes in human serum and extracellular space

A71-38562

Pigeon acclimatization response to simulated high altitude, determining body weights, hematocrit ratios, hemoglobin concentrations and plasma and blood volumes

A71-38563

ALTITUDE SIMULATION

Pigeon acclimatization response to simulated high altitude, determining body weights, hematocrit ratios, hemoglobin concentrations and plasma and blood volumes

A71-38563

ALTITUDE TOLERANCE

Polycythemia and altitude hypoxia effects on rats heart and sea level exercise tolerance

A71-38980

ALVEOLAR AIR

Alveolar-arterial oxygen pressure difference during controlled hyperventilation and posthyperventilatory phase

A71-38200

Diffusion component of alveolar-arterial oxygen pressure differences in man at rest and during exercise

A71-38556

Variable tidal volume effects on lung test gas washout parameters

A71-38565

Respiratory reflex mechanism of deep breath occurrence after period of airway occlusion in rabbits related to stimulation of vagal receptors

A71-39040

AMINES

Amino silica gel absorbers for atmospheric purification systems of spacecraft cabins

N71-33468

AMINO ACIDS

Cerebral gamma-aminobutyric acid metabolism and hyperbaric oxygen induced seizures in chicks during brain development, noting increased membrane permeability

A71-38970

Amino acid levels in fasted and fed rats plasma, liver, muscle and kidney during and after exercise, noting glutamine decrease in liver tissue

A71-38982

Automatic analysis system for separating and identifying amino acids to detect extraterrestrial life [NASA-TT-P-13765]

N71-32232

AMPLIFIERS

Research on avalanche type semiconductor radiation detectors using video amplifiers
[BYO-3246-TA-8] N71-33775

ANALOG COMPUTERS

Analog computer analysis of radiocardiograms, determining cardiac function and pulmonary blood volume
A71-38802

ANALOG SIMULATION

Development of analog model of neuron adaptation and simulation of spontaneous activity of neuron network
[JPRS-53597] N71-32032

ANALOG TO DIGITAL CONVERTERS

Analog to digital converters for voice signal analysis
[JPRS-53606] N71-32009
Analog to digital converters for description and recognition of voice signals
N71-32011

ANATOMY

Heat removal from space suit, discussing anatomic and physiological features suitable for cooling
A71-39224

ANGULAR ACCELERATION

Stroke number and vestibular nystagmus duration and frequency under successively increasing angular acceleration from tests on guinea pigs
A71-39238
Disoriented visual tracking performance of humans during angular acceleration as result of alcohol consumption
[FAA-AM-71-20] N71-32433
Angular acceleration effects on guinea pig vestibular nystagmus
N71-33473

ANIMALS

Biological experiments on plants, animals and bacteria aboard Zond 5, 6 and 7 space probes
A71-39134

ANTHROPOMETRY

Anthropometric survey of aviation personnel with bivariate tables noting relationships between selected variables
[AD-723796] N71-31942
Collation of adult anthropometry with source both domestic and foreign, male and female, military and civilian - Vol. 2
[AD-723630] N71-32715
Anthropometric methods for determining psychic and physical stresses caused by vibration effects on human body
[DLR-MITT-70-11] N71-33970

AORTA

Second heart sound changes due to position and magnitude variations of aortic or pulmonary component
A71-37233

APOLLO PROJECT

Human response to space environment, discussing prolonged weightlessness, extravehicular work and lunar surface activity
A71-37492

APPROACH INDICATORS

Approach indicator oscillation and illuminating effects on human performance of compensatory tracking tasks
[NASA-CR-119640] N71-31618

ARCTIC REGIONS

Investigation of tundra biogeocenoses noting species saturation of surface layer and soil and eleven phases of turnover
N71-33504
Arctic field tests of prototype life rafts capable of protecting astronauts from cold water exposure for 72 hours
[NASA-CR-121449] N71-33718

ARRHYTHMIA

Analog computer program and display device for detecting arrhythmia signals during electrocardiography
[AD-711039] N71-31612
Electrocardiographic monitoring device with arrhythmia signal detector and steplike output of R-wave amplitudes
[AD-712668] N71-31622
Spontaneous cardiac arrhythmias induced by bromotrifluoromethane in monkeys

[AD-723645]

N71-31733

ARTERIES

Cardiovascular system mathematical model for evaluating system parameters effects on circulatory indices including minute volume and arterial tension
A71-37777

Alveolar-arterial oxygen pressure difference during controlled hyperventilation and posthyperventilatory phase
A71-38200

Diffusion component of alveolar-arterial oxygen pressure differences in man at rest and during exercise
A71-38556

Inspired oxygen concentrations effects on arterial and mixed venous pH, carbon dioxide uptake and oxygen partial pressure in normal subjects
A71-39442

Stagnant asphyxia in cat carotid body during abrupt blood pressure drop by simultaneous carotid artery clamping and tap opening
A71-39443

ARTIFICIAL GRAVITY

Space shuttle orbital centrifuge systems configuration, comparing artificial gravity experiment performance options
[AIAA PAPER 71-860] A71-37274

ARTIFICIAL INTELLIGENCE

Cybernetics including models for statistical decision making, biomechanical systems, and complex stochastic system
[JPRS-53531] N71-32088

ASPHYXIA

Stagnant asphyxia in cat carotid body during abrupt blood pressure drop by simultaneous carotid artery clamping and tap opening
A71-39443

ASTRONAUT PERFORMANCE

Human response to space environment, discussing prolonged weightlessness, extravehicular work and lunar surface activity
A71-37492

Mathematical models for control activity of human spaceship operator
N71-33461

ASTRONAUTS

Astronaut chromosome aberrations, presenting peripheral blood leukocytes cytogenetic tests for pre and post space flight
A71-39227

Metabolic balance studies of two astronauts during 10 day preflight phase, Gemini 7 flight of 14 days, and 4 day postflight recovery phase
N71-33255

ASTRONOMICAL TELESCOPES

Astronomical telescopes image motion, distortion and scintillation, examining atmospheric refractive index and density/temperature variation effects
A71-38571

ATHLETES

World champion marathon runner metabolic responses during submaximal and maximal treadmill running, recording oxygen consumption, heart rate and lactic acid
A71-38890

ATMOSPHERIC CIRCULATION

Atmospheric circulation and aerosol pollution transport noting role of temperature inversions
[IFA-RDP-36] N71-32863

ATMOSPHERIC DENSITY

Astronomical telescopes image motion, distortion and scintillation, examining atmospheric refractive index and density/temperature variation effects
A71-38571

ATMOSPHERIC REFRACTION

Astronomical telescopes image motion, distortion and scintillation, examining atmospheric refractive index and density/temperature variation effects
A71-38571

ATMOSPHERIC TEMPERATURE

Astronomical telescopes image motion, distortion and scintillation, examining atmospheric refractive index and density/temperature variation effects
A71-38571

ATROPHY

SUBJECT INDEX

ATROPHY

Atrophy in monkeys due to immobilization and implications for extended manned space flight
N71-33260

ATTENTION

Visual attention automatization due to repeated stimulus experience, noting fixation rate habituation concomitance with fixations spatial distribution uncertainty reduction
A71-39545

Analysis of cerebral slow potentials underlying human attentive processes in central nervous system
[NASA-CR-121409]
N71-33437

AUDITORY DEFECTS

Aircraft noise effect on hearing impairment of cockpit crews in civil aviation, using audiometric evaluation
A71-38222

AUDITORY PERCEPTION

Human response to auditory stimuli start and cessation, noting time lag and perception duration
A71-37283

Analog to digital converters for voice signal analysis
[JPRS-53606]
N71-32009

Problems of automatic auditory pattern recognition and solutions
N71-32010

Psychophysical evidence of lateral inhibition in hearing
[IZP-1971-8]
N71-33859

AUDITORY STIMULI

Human response to auditory stimuli start and cessation, noting time lag and perception duration
A71-37283

AUTOMATA THEORY

Model for quantitatively examining performance of automatic machines with normal and disturbed functions in statistical decision making
N71-32089

AUTOMATIC CONTROL

Automatic regulation of volumetric blood flow rate during artificial blood circulation, using electromechanical system for controlling arterial pump of cardiopulmonary machine
A71-38641

Mathematical models for control activity of human spaceship operator
N71-33461

AUTONOMIC NERVOUS SYSTEM

Respiratory reflex mechanism of deep breath occurrence after period of airway occlusion in rabbits related to stimulation of vagal receptors
A71-39040

AVALANCHE DIODES

Research on avalanche type semiconductor radiation detectors using video amplifiers
[NYO-3246-TA-8]
N71-33775

B

BACTERIA

Biological experiments on plants, animals and bacteria aboard Zond 5, 6 and 7 space probes
A71-39134

BACTERIOLOGY

Application of environmental microbiology to spacecraft quarantine procedures
[NASA-CR-119638]
N71-31601

Bibliography of scientific publications and presentations relating to planetary quarantine for year 1970 - Vol. 5
[NASA-CR-121325]
N71-32231

BED REST

Nasal vascular system reactions during 120-day bed rest hypokinesia under drug affected metabolism
A71-39229

Shin muscle electrical activity during standing after 120 day bed rest hypokinesia from EMG measurement
A71-39230

Bed rest effects on human hemodynamic and gaseous metabolism, observing increased cardiac output and decreased oxygen consumption and carbon dioxide production

Summation dial vectorial representation of stationary and nonstationary time series data, relating rhythms in bed rest study
A71-39231

Red cell mass and plasma volume changes noted in hypodynamic states of bed rest and water immersion compared to changes observed during earth orbital missions
A71-39480

Bed rest and immobilization effects on oxygen transport system of human body
N71-33253

Hemodynamic and body fluid alterations induced by varying periods of bed rest
N71-33262

Forearm vascular responses to brachial artery infusions of tyramine and norepinephrine after two weeks bed rest
N71-33263

Total body exercise effect on metabolic, hematologic, and cardiovascular consequences of prolonged bed rest
N71-33264

Long term bed rest effects on mineral balance and bone density in normal individuals
N71-33265

Effects of prolonged bed rest on bone and calcium metabolism and mineral content loss of os calcis
N71-33266

Relationship between diurnal and meal driven excretory patterns in human kidney during bed rest
N71-33267

Carbohydrate intolerance in human body during two weeks of bed rest
N71-33268

Bed rest effects on glucose regulation in human beings
N71-33269

Red cell mass loss in human beings as result of bed rest
N71-33270

N71-33271

BIBLIOGRAPHIES

Cross-referenced directory of reports of Human Engineering Laboratories 1953 to 1970
N71-31617

Analog to digital converters for voice signal analysis
[JPRS-53606]
N71-32009

Problems of automatic auditory pattern recognition and solutions
N71-32010

Analog to digital converters for description and recognition of voice signals
N71-32011

Bibliography of scientific publications and presentations relating to planetary quarantine for year 1970 - Vol. 5
[NASA-CR-121325]
N71-32231

Injuries and sickness caused by radiation and radioactive decay - bibliographies
[AD-722970]
N71-32239

Bibliography of literature on environmental pollution, noise pollution, and ear protection devices
[AD-724650]
N71-33088

Bibliography on effects of gamma rays, fission fragments, and neutrons on organisms, food, tissues, and nervous system
[AD-724600]
N71-33276

BINARY DATA

Ear inherent channel capacity estimation by applying Shannon equations for binary signal transmission
A71-39769

BIOACOUSTICS

UH-1P helicopter acoustic measurements during gunfire and rocket firing including bioacoustic factors
[AD-713830]
N71-31613

BIOASSAY

Activation impulse blocking in nerve, using inhomogeneous Lillie electrochemical model
A71-37282

BIOASTRONAUTICS

Space station biological/medical laboratories, discussing physiology, pathology, hematological, static and dynamic equilibrium, neuropsychic,

- dietetic, radiobiological, hygiene and prophylaxis departments A71-37308
- BIOCHEMISTRY**
 Biological and biochemical cyclic phenomena, including circadian rhythms A71-39475
 Preparation of biochemical materials for electron microscopy [ISS-70/8] N71-32968
- BIOCONTROL SYSTEMS**
 Retinal adaptation to prism-displaced hand image in terms of sensorimotor coordination central control change A71-37543
 Proposed prism adaptation model suggesting visual motor control loop as linear system comprising independent subsystems A71-37544
 Visual target pursuit tracking test confirming error amending by central mechanism without sensory feedback A71-37545
 Stop test method to study acceleration in movement control processes in man, considering elbow joint movements in normal and pathological tremors in Parkinson disease afflicted subjects A71-37569
- BIOELECTRIC POTENTIAL**
 Human visual cerebral cortex potentials evoked by sinusoidally modulated field under stabilized and unstabilized conditions A71-38279
 Visual evoked potential relationship to apparent size reduction of invariant retinal image A71-38281
 Primary biological receptor element analogous electronic model for potential and afferent pulse train responses to stimuli A71-38894
 Radial acceleration effects on spinal cord induced potentials of intact and labyrinthectomized rats N71-33456
- BIOELECTRICITY**
 Activation impulse blocking in nerve, using inhomogeneous Lillie electrochemical model A71-37282
 Human respiratory muscles electrical activity, discussing correlation analysis of interferential electromyograms from external intercostal muscles during breathing exercises A71-38198
 Phrenic nerve activity correlation with ventilation in anesthetized cats, analyzing relationship between phrenic impulse rate and integrated electrical activity A71-38983
 Motor and vestibular analysors and frontal hypothalamus role in gravitational loads compensation during orthostasis, noting respiration, arterial pressure and brain bioelectric activity changes A71-39223
 Shin muscle electrical activity during standing after 120 day bed rest hypokinesia from EMG measurement A71-39230
- BIOENGINEERING**
 Automatic regulation of volumetric blood flow rate during artificial blood circulation, using electromechanical system for controlling arterial pump of cardiopulmonary machine A71-38641
- BIOINSTRUMENTATION**
 Phonocardiograph design and calibration for accurate measuring and recording of cardiac vibration displacements, velocities and accelerations A71-37231
 Frequency phonocardiography technique for heart sounds and murmurs registration, producing analog voltage proportional to frequency by zero crossing detector A71-37234
 Continuous recording of human rectal temperature under extreme environmental conditions, using battery powered thermographs with thermistor probes A71-39041
- Lung scanning, describing moving detectors, electronic apparatus adjustment and choice of radionuclide and labelled compound A71-39072
- BIOLOGICAL EFFECTS**
 Book on biological effects of radiation covering ionizing radiation properties and effects at molecular, cellular and tissue levels A71-38048
 Signals convergence of various sensory modalities as function of impulse reactions of individual brain neurons in mammals A71-38197
 Double standard for national levels of exposure and biological hazards of microwave radiation, comparing Soviet work to U.S. A71-38442
 Biological experiments on plants, animals and bacteria aboard Zond 5, 6 and 7 space probes A71-39134
 Tissular and cellular biological resistance as indices for organism resistance to adverse effects, noting increase due to muscular training and cold adaptation A71-39219
 Medical, zoological and biological effects of ELP signals in atmosphere, comparing with EEG alpha and gamma rhythm A71-39478
- BIOLOGICAL EVOLUTION**
 Development of scientific principles of protecting and transforming nature for improving environment and optimal use of natural conditions [JPRS-53743] N71-33501
 Analysis and definition of tasks in field of biogeocenology N71-33502
- BIOLOGY**
 Role of individual components of biogeocenosis in organization of structure and functions N71-33509
 Discussion of photosynthesis process and production of cenoses N71-33510
- BIOMEDICAL DATA**
 Summation dial vectorial representation of stationary and nonstationary time series data, relating rhythms in bed rest study A71-39480
- BIONICS**
 Human operator models parameter estimation by stochastic approximation, considering continuous and sampled data models A71-37648
 Cardiovascular system mathematical model for evaluating system parameters effects on circulatory indices including minute volume and arterial tension A71-37777
 Thermal behavior simulation of cooling biological system, describing heat generation and transfer at normothermic to hibernating body temperatures with mathematical model A71-38199
 Signal propagation in model neuron network in terms of differential equations system, representing retina major cell types in planar model A71-38276
 Primary biological receptor element analogous electronic model for potential and afferent pulse train responses to stimuli A71-38894
 Small pressure wave transmission in abdominal venae cavae of dogs in mathematical model development for viscoelastic behavior of large veins A71-38987
 Spacecraft manual control investigation, using human operator models described by linear transfer function with variable coefficients A71-39226
 Pulmonary nitrogen washout and carbon monoxide uptake, developing dynamic mathematical models for volume and distensibility distributions in airways and alveoli A71-39441

BIOTECHNOLOGY

SUBJECT INDEX

- Cortical responses of awake cat to narrow-band FM noise stimuli, proposing neuronal model
A71-39767
- Cybernetics including models for statistical decision making, biomechanical systems, and complex stochastic system
[JPRS-53531]
N71-32088
- Model for quantitatively examining performance of automatic machines with normal and disturbed functions in statistical decision making
N71-32089
- Dynamic reactions of operators with random vibrational stimuli and biomechanical systems
N71-32090
- Encoding function of neurophysiological syncoders
[AD-724072]
N71-33329
- BIOTECHNOLOGY**
- Radioisotope thermoelectric generators in micro/milliwatt power range for biomedical applications
A71-38912
- BIVARIATE ANALYSIS**
- Anthropometric survey of aviation personnel with bivariate tables noting relationships between selected variables
[AD-723796]
N71-31942
- BLOOD**
- Prolonged bed rest effects on human chromosomes during space flight simulation and actual space flight
N71-33462
- BLOOD CIRCULATION**
- Cardiovascular system mathematical model for evaluating system parameters effects on circulatory indices including minute volume and arterial tension
A71-37777
- Heart maximal aerobic and anaerobic power and stroke volume, discussing cardiac output and blood oxygen capacity measurements in subalpine population subjects
A71-38887
- Human retinal blood circulation changes and vision disturbance under transversely directed acceleration, using dark chamber teleophthalmoscopy
A71-39228
- Effects of posture on body fluid circulation and long term immersion effects on physiological mechanisms
N71-33273
- Hypokinesia effects on nasal blood circulation of man
N71-33464
- BLOOD FLOW**
- Regional cerebral blood flow, tissue oxygen, EEG activity and behavioral reaction at high pressure
A71-38557
- Automatic regulation of volumetric blood flow rate during artificial blood circulation, using electromechanical system for controlling arterial pump of cardiopulmonary machine
A71-38641
- Cell volume analyzer for sensing individual blood cells and plotting number as function of size
A71-38824
- Monograph on blood flow rates instantaneous measurement from ultrasound signals of Doppler flowmeter, discussing steady laminar flow test results
A71-39262
- Potassium concentrations and osmolality levels changes effects on vascular resistance in subcutaneous adipose tissue blood flow
A71-39379
- Transverse acceleration effects on blood flow in human retina
N71-33463
- BLOOD PLASMA**
- Renin, plasma norepinephrine and epinephrine responses to work loads of various intensities, evaluating sympathetic nervous system as stimulus for secretion
A71-38551
- Physiological responses of burro *Equus asinus* to oxygen lack in mountain altitudes, studying red blood cell and plasma volumes
A71-38560
- Plasma renin activity in hypertonic and normotonic persons exposed to exogenous stress, comparing with measurements at rest and in orthostasis
A71-38893
- Amino acid levels in fasted and fed rats plasma, liver, muscle and kidney during and after exercise, noting glutamine decrease in liver tissue
A71-38982
- Comparative abdomen and head shield effect during gamma irradiation of dogs on protein fractions in blood serum, noting increased globulins and glutamate aspartate transferases
A71-39222
- Red cell mass and plasma volume changes noted in hypodynamic states of bed rest and water immersion compared to changes observed during earth orbital missions
N71-33253
- BLOOD PRESSURE**
- Cardiovascular system mathematical model for evaluating system parameters effects on circulatory indices including minute volume and arterial tension
A71-37777
- Pulmonary diastolic pressure relation to left ventricle and atrium of patient with diagnostic heart catheterization at rest
A71-38296
- Autoclave chronic catheter system and restraining box for blood sampling and pressure measurement for hibernating mammals
A71-38568
- Motor and vestibular analysors and frontal hypothalamus role in gravitational loads compensation during orthostasis, noting respiration, arterial pressure and brain bioelectric activity changes
A71-39223
- Active vasodilation in gracilis muscle vascular bed due to perfusion pressure changes
A71-39378
- Stagnant asphyxia in cat carotid body during abrupt blood pressure drop by simultaneous carotid artery clamping and tap opening
A71-39443
- Intraocular pressure distribution measurements on healthy subjects engaged in mental work
N71-33469
- BODY COMPOSITION (BIOLOGY)**
- Hamster body fat, water and density measurements by dilution method and air displacement technique, comparing to determination by direct chemical analysis upon sacrificing
A71-38555
- Measuring instruments for in vivo bone mineral content and body composition measurement
[NASA-CR-121415]
N71-33223
- BODY FLUIDS**
- High altitude exposure effects on concentration and total quantity of electrolytes in human serum and extracellular space
A71-38562
- Sodium and cations elimination by kidneys during water-salt metabolism changes due to high temperature and hypodynamia
A71-39232
- Hemodynamic and body fluid alterations induced by varying periods of bed rest
N71-33263
- Effects of posture on body fluid circulation and long term immersion effects on physiological mechanisms
N71-33273
- BODY TEMPERATURE**
- Thermal behavior simulation of cooling biological system, describing heat generation and transfer at normothermic to hibernating body temperatures with mathematical model
A71-38199
- Postexercise elevated tissue temperatures contributions to oxygen consumption in rats, suggesting hypothalamic adjustment
A71-38981
- Continuous recording of human rectal temperature under extreme environmental conditions, using battery powered thermographs with thermistor probes
A71-39041

C

- Heat removal from space suit, discussing anatomic and physiological features suitable for cooling
A71-39224
- Dynamic mathematical model of physiological regulation of body temperature in human beings
[NASA-CR-1855] N71-33401
- BODY VOLUME (BIOLOGY)**
Variable tidal volume effects on lung test gas washout parameters
A71-38565
- BONES**
Measuring instruments for in vivo bone mineral content and body composition measurement
[NASA-CR-121415] N71-33223
Conference on aerospace environments, manned space flight, weightlessness simulation, musculoskeletal and cardiovascular systems, bone loss, mineral metabolism, and hematology
[NASA-SP-269] N71-33251
Measurement of bone density loss during manned space flight
N71-33254
Measurement of bone mass loss as result of immobilization
N71-33256
Effects of inactivity or immobilization on bone loss
N71-33258
Nondestructive measurement of density, breaking strength, and modulus of elasticity of bones
N71-33261
Long term bed rest effects on mineral balance and bone density in normal individuals
N71-33266
Effects of prolonged bed rest on bone and calcium metabolism and mineral content loss of os calcis
N71-33267
Research and development, weightlessness simulation, calcium metabolism, manned space flight, pressure suits, immobilization, and aerospace medicine
N71-33275
- BRAIN**
Circadian rhythm maturation of brain norepinephrine and serotonin in rat, relating spontaneous motor activity and sleep-wakefulness mechanism
A71-38071
Signals convergence of various sensory modalities as function of impulse reactions of individual brain neurons in mammals
A71-38197
Electroencephalographic evaluation of brain functions disturbances in response to stress in flying personnel, relating fatigue and rest periods allocation
A71-38223
Protein content in cytoplasm of neurons and glial satellite cells in supraoptical and red nuclei of white rat brains during natural and paradoxical phase deprived sleep
A71-38545
Brain polysomes disaggregation and tryptophan elevation in immature rats and adult animals after L-dopa administration
A71-38979
Synaptic junction model for memory in brain
[NASA-TN-D-6456] N71-32474
- BRAIN CIRCULATION**
Regional cerebral blood flow, tissue oxygen, EEG activity and behavioral reaction at high pressure
A71-38557
- BREAKING**
Nondestructive measurement of density, breaking strength, and modulus of elasticity of bones
N71-33261
- BREATHING**
Human respiratory muscles electrical activity, discussing correlation analysis of interferential electromyograms from external intercostal muscles during breathing exercises
A71-38198
Respiratory reflex mechanism of deep breath occurrence after period of airway occlusion in rabbits related to stimulation of vagal receptors
A71-39040
- CALCIUM**
Effects of prolonged bed rest on bone and calcium metabolism and mineral content loss of os calcis
N71-33267
- CALCIUM METABOLISM**
Conference on aerospace environments, manned space flight, weightlessness simulation, musculoskeletal and cardiovascular systems, bone loss, mineral metabolism, and hematology
[NASA-SP-269] N71-33251
Research and development, weightlessness simulation, calcium metabolism, manned space flight, pressure suits, immobilization, and aerospace medicine
N71-33275
- CALIBRATING**
Simultaneous calibration of gas analyzers and meters for continuous process gas stream composition monitoring
A71-38566
- CALORIC REQUIREMENTS**
Exercise-induced human protein catabolism not due to caloric deficit
A71-38552
- CARBOHYDRATES**
Carbohydrate intolerance in human body during two weeks of bed rest
N71-33269
- CARBON DIOXIDE**
Amino silica gels absorption properties with respect to carbon dioxide, hydrogen sulfide and water vapor, comparing affinity
A71-39233
Inspired oxygen concentrations effects on arterial and mixed venous pH, carbon dioxide uptake and oxygen partial pressure in normal subjects
A71-39442
- CARBON DIOXIDE TENSION**
Bed rest effects on human hemodynamic and gaseous metabolism, observing increased cardiac output and decreased oxygen consumption and carbon dioxide production
A71-39231
- CARBON MONOXIDE**
Pulmonary nitrogen washout and carbon monoxide uptake, developing dynamic mathematical models for volume and distensibility distributions in airways and alveoli
A71-39441
- CARDIAC VENTRICLES**
Canine ventricular myocardium as cardiac beta-adrenergic receptor, describing binding of norepinephrine to microsomal particles
A71-37900
Pulmonary diastolic pressure relation to left ventricle and atrium of patient with diagnostic heart catheterization at rest
A71-38296
- CARDIOGRAMS**
Analog computer analysis of radiocardiograms, determining cardiac function and pulmonary blood volume
A71-38802
- CARDIOLOGY**
Frequency phonocardiography technique for heart sounds and murmurs registration, producing analog voltage proportional to frequency by zero crossing detector
A71-37234
- CARDIOVASCULAR SYSTEM**
Cardiovascular system mathematical model for evaluating system parameters effects on circulatory indices including minute volume and arterial tension
A71-37777
Instrumental learning of cardiovascular and visceral responses and behavioral, physiological and biochemical consequences in relation to psychosomatic therapy
A71-39548
Spontaneous cardiac arrhythmias induced by bromotrifluoromethane in monkeys
[AD-723645] N71-31733
Conference on aerospace environments, manned space flight, weightlessness simulation, musculoskeletal and cardiovascular systems, bone

CAROTID SINUS REFLEX

SUBJECT INDEX

- loss, mineral metabolism, and hematology
[NASA-SP-269] N71-33251
- Physiological changes in cardiovascular and
musculoskeletal systems during manned space
flight N71-33252
- Bed rest and immobilization effects on oxygen
transport system of human body N71-33262
- Total body exercise effect on metabolic,
hematologic, and cardiovascular consequences of
prolonged bed rest N71-33265
- Deconditioning and its prevention by simulating
hydrostatic gradient by use of cardiovascular
conditioning suit N71-33274
- CAROTID SINUS REFLEX**
- Stagnant asphyxia in cat carotid body during
abrupt blood pressure drop by simultaneous
carotid artery clamping and tap opening A71-39443
- CATHETERIZATION**
- Autoclave chronic catheter system and restraining
box for blood sampling and pressure measurement
for hibernating marmots A71-38568
- CATIONS**
- Sodium and cations elimination by kidneys during
water-salt metabolism changes due to high
temperature and hypodynamia A71-39232
- CATS**
- Stagnant asphyxia in cat carotid body during
abrupt blood pressure drop by simultaneous
carotid artery clamping and tap opening A71-39443
- Compensatory capabilities of vestibules,
hypothalamus, and central nervous system toward
gravitational effects on cats during orthostasis
N71-33458
- CELL DIVISION**
- Mammalian cells cultivation at suboptimal
temperatures, considering reproduction and
cytophysiological changes A71-39220
- CELLS (BIOLOGY)**
- Book on biological effects of radiation covering
ionizing radiation properties and effects at
molecular, cellular and tissue levels A71-38048
- Chlorella extracellular metabolites, identifying
indole nature biologically active substances A71-38544
- Cell volume analyzer for sensing individual blood
cells and plotting number as function of size A71-38824
- Cell contacts in canine duodenal smooth muscle
layers, using perfusion with glutaraldehyde
fixative A71-38985
- Tissular and cellular biological resistance as
indices for organism resistance to adverse
effects, noting increase due to muscular
training and cold adaptation A71-39219
- Mammalian cells cultivation at suboptimal
temperatures, considering reproduction and
cytophysiological changes A71-39220
- Cryogenics applications to cryosurgery and long
term low temperature storage of living cells and
tissues A71-39252
- Low temperature cytophysiological adaptation of
human and mammalian cells N71-33455
- Radiation effects on cytoplasmic structure and
differential activity of genes [NYO-2356-43] N71-33934
- CENTRAL NERVOUS SYSTEM**
- Firing frequency of single trochlear nerve fibers
during eye movements in alert monkey A71-37413
- Conditioned motor reactions characterizing higher
nervous activity, using logokinetic method A71-37447
- Test equipment for evaluating human higher nervous
activity, noting use for radiotelegraphist
- selection A71-37775
- Analysis of cerebral slow potentials underlying
human attentive processes in central nervous
system [NASA-CR-121409] N71-33437
- CENTRIFUGES**
- Space shuttle orbital centrifuge systems
configuration, comparing artificial gravity
experiment performance options [AIAA PAPER 71-860] A71-37274
- CENTRIFUGING STRESS**
- Chronic centrifugation effects on water intake and
urine output in mice, considering food intake
and growth rate A71-38984
- CEREBRAL CORTEX**
- Activity correlation of adjacent neurons of cat
cerebral cortex somatosensory zone, considering
distribution of same direction /cophase/ and
different direction /counterphase/ of background
rhythms A71-37392
- Functional relation of primary responses and unit
spike activity at subcortical visual centers in
cats A71-37443
- Human visual cerebral cortex potentials evoked by
sinusoidally modulated field under stabilized
and unstabilized conditions A71-38279
- Visually evoked cerebral cortex responses to on-
and off-set of patterned light and contour
density and sharpness in humans A71-38282
- Cerebral gamma-aminobutyric acid metabolism and
hyperbaric oxygen induced seizures in chicks
during brain development, noting increased
membrane permeability A71-38970
- Cortical responses of awake cat to narrow-band FM
noise stimuli, proposing neuronal model A71-39767
- Analysis of cerebral slow potentials underlying
human attentive processes in central nervous
system [NASA-CR-121409] N71-33437
- CEREBRUM**
- Regional cerebral blood flow, tissue oxygen, EEG
activity and behavioral reaction at high
pressure A71-38557
- CHANNEL CAPACITY**
- Ear inherent channel capacity estimation by
applying Shannon equations for binary signal
transmission A71-39769
- CHEMICAL COMPOSITION**
- Mineral composition optimization of nutrient
medium for Hydrogenomonas, using steepest ascent
method for mathematical planning of experiments A71-39236
- Composition, and chemical, physical, and
concentrative properties of human urine
[NASA-CR-1802] N71-32520
- CHEMICAL PROPERTIES**
- Composition, and chemical, physical, and
concentrative properties of human urine
[NASA-CR-1802] N71-32520
- CHEMORECEPTORS**
- Respiratory chemoreceptors and acid-base
alterations effects on adrenocortical activation
during hypoxia in dogs A71-38986
- CHLORELLA**
- Chlorella extracellular metabolites, identifying
indole nature biologically active substances A71-38544
- Combined action of vibration and gamma irradiation
on sporulation dynamics, survival rate and
mutability of chlorella A71-39237
- Combined vibration and gamma irradiation effects
on Chlorella culture yield N71-33472
- CHOLESTEROL**
- Cholesterol and esterified cholesterol
distribution in human skin from analysis on fat,
epidermis, corium, subcutaneous tissue and serum

by chromatographic/colorimetric methods A71-38892

CHROMOSOMES

Brain polyomes disaggregation and tryptophan elevation in immature rats and adult animals after L-dopa administration A71-38979

Astronaut chromosome aberrations, presenting peripheral blood leukocytes cytogenetic tests for pre and post space flight A71-39227

Prolonged bed rest effects on human chromosomes during space flight simulation and actual space flight N71-33462

CHRONIC CONDITIONS

Chronic hypercapnia effects on oxygen affinity and 2,3-diphosphoglycerate in red cell from tests on guinea pigs A71-39440

CIRCADIAN RHYTHMS

Circadian rhythm maturation of brain norepinephrine and serotonin in rat, relating spontaneous motor activity and sleep-wakefulness mechanism A71-38071

Biological and biochemical cyclic phenomena, including circadian rhythms A71-39475

Molecular nature of circadian oscillations mechanism, suggesting nucleic acids implication A71-39476

Circadian rhythms of human renal excretions in polar, temperate and equatorial regions A71-39477

Relationship between diurnal and meal driven excretory patterns in human kidney during bed rest N71-33268

CIRCULATORY SYSTEM

Noisy environment effects on circulatory, respiratory and metabolic parameters during physical exercise, measuring heart rate, systolic blood pressure, oxygen intake and respiratory quotient A71-38889

CIRCULUNAR TRAJECTORIES

Circulunar space flight effects on spiderwort, dry seeds and onion bulbs germinating capacity, growth stimulation and chromosome rearrangements A71-39605

CIVIL AVIATION

Aircraft noise effect on hearing impairment of cockpit crews in civil aviation, using audiometric evaluation A71-38222

COCHLEA

Intracochlear electric potential of anesthetized cats recorded with potassium filled glass micropipets, determining magnitude and phase of responses A71-39768

CODNS

Three phase code transformation task reliability and correlation, representing general factor analytic intellectual abilities and personality characteristics A71-39073

CODING

Encoding function of neurophysiological syncoders [AD-724072] N71-33329

COLD ACCLIMATIZATION

Tissular and cellular biological resistance as indices for organism resistance to adverse effects, noting increase due to muscular training and cold adaptation A71-39219

Physical training, cold adaptation, and adaptogen pharmaceuticals for increased physiological stress resistance in rats N71-33454

COLD WATER

Arctic field tests of prototype life rafts capable of protecting astronauts from cold water exposure for 72 hours [NASA-CR-121449] N71-33718

COLD WEATHER

Cold climate clothed human windchill tables, considering various heat transfer modes and skin

temperature A71-39205

COLOR

Color and music distraction for operator in isolated environment and counteract psychophysiological activity impairment A71-39225

Color and illuminance effects on visual space perception [AD-724623] N71-33138

COLOR CENTERS

Spectral sensitivity and dominance of color center cones in macaque monkeys based on flicker electroretinography [IZF-1971-10] N71-33823

COLOR VISION

Hue shifts by intermittent stimulation, suggesting interaction between stimulus intermittency and temporal color coding in visual system A71-38283

Wavelength discrimination from color naming by young adults with normal visual acuity and color vision A71-38285

COLORIMETRY

Determination of alpha-tocopherol in freeze dried foods by modified colorimetric procedure [AD-713829] N71-31610

COMPENSATORY TRACKING

Approach indicator oscillation and illuminating effects on human performance of compensatory tracking tasks [NASA-CR-119640] N71-31618

COMPLEX SYSTEMS

Cybernetics including models for statistical decision making, biomechanical systems, and complex stochastic system [JPRS-53531] N71-32088

COMPUTER PROGRAMS

Analog computer program and display device for detecting arrhythmia signals during electrocardiography [AD-711039] N71-31612

COMPUTER TECHNIQUES

Analog computer analysis of radiocardiograms, determining cardiac function and pulmonary blood volume A71-38802

CONDITIONING (LEARNING)

Conditioned motor reactions characterizing higher nervous activity, using logokinetic method A71-37447

Instrumental learning of cardiovascular and visceral responses and behavioral, physiological and biochemical consequences in relation to psychosomatic therapy A71-39548

CONFERENCES

Interdisciplinary cycle research - Conference, Noordwijk, Netherlands, June 1970 A71-39474

Conference on aerospace environments, manned space flight, weightlessness simulation, musculoskeletal and cardiovascular systems, bone loss, mineral metabolism, and hepatology [NASA-SP-269] N71-33251

CONFINEMENT

Color and music effects on humans during prolonged isolation in confined space N71-33460

COOLING

Heat removal from space suit, discussing anatomic and physiological features suitable for cooling A71-39224

CORONARY CIRCULATION

Diastolic heart sounds and filling waves in coronary artery disease, relating graphic abnormalities and clinical, arteriographic and hemodynamic findings A71-37550

Right and left heart and pulmonary blood volume determination, using radiocardiograms and analog computer analysis A71-38801

COSMIC RAYS

Apollo astronauts light flashes observation during lunar flight, discussing interpretation as scintillations in eye lens by multiply charged cosmic rays focusing on retina

- Visual sensations produced by cosmic ray muons passing in different directions through human eyes and head A71-37299
- A71-38677
- CREATININE**
Urinary protein excretion rates in high altitude inhabitants, showing polycythemia effect on creatinine clearances levels A71-38561
- CRYOGENIC STORAGE**
Cryogenics applications to cryosurgery and long term low temperature storage of living cells and tissues A71-39252
- CRYOGENICS**
Cryogenics applications to cryosurgery and long term low temperature storage of living cells and tissues A71-39252
- CULTIVATION**
Mammalian cells cultivation at suboptimal temperatures, considering reproduction and cytophysiological changes A71-39220
- CULTURE TECHNIQUES**
Mineral composition optimization of nutrient medium for Hydrogenomonas, using steepest ascent method for mathematical planning of experiments A71-39236
Optimal mineral composition in nutrient for autotrophic Hydrogenomonas cultivation N71-33471
- CYBERNETICS**
Cybernetics research involving neuron network simulation and synthesis of optimal scanning systems N71-32033
Cybernetics including models for statistical decision making, biomechanical systems, and complex stochastic system [JPRS-53531] N71-32088
- CYTOGENESIS**
Astronaut chromosome aberrations, presenting peripheral blood leukocytes cytogenetic tests for pre and post space flight A71-39227
- CYTOLOGY**
Mammalian cells cultivation at suboptimal temperatures, considering reproduction and cytophysiological changes A71-39220
Low temperature cytophysiological adaptation of human and mammalian cells N71-33455
- CYTOPLASM**
Protein content in cytoplasm of neurons and glial satellite cells in supraoptical and red nuclei of white rat brains during natural and paradoxical phase deprived sleep A71-38545
Radiation effects on cytoplasmic structure and differential activity of genes [NYO-2356-43] N71-33934

D

- DARK ADAPTATION**
Threshold electrical phosphene dependence on impulse duration and stimulation frequency in subjects adapted to darkness A71-37444
- DATA CORRELATION**
Three phase code transformation task reliability and correlation, representing general/factor analytic intellectual abilities and personality characteristics A71-39073
Multiple correlation of university and flight training biographical information as management tool in personnel selection for pilot training [AD-717941] N71-31620
Pilot training performance data correlation in performance and probability estimation of training completion for advanced training personnel selection [AD-718848] N71-31621
- DATA TRANSMISSION**
Encoding function of neurophysiological syncoders

- [AD-724072] N71-33329
- DECISION MAKING**
Human psychomotor performance measurements in rotating environments, using Langley complex coordinator and decision response time devices [AIAA PAPER 71-887] A71-37275
Aircraft recognition accuracy and decision speed comparing single observers and four-man crews [AD-714213] N71-31625
Model for quantitatively examining performance of automatic machines with normal and disturbed functions in statistical decision making N71-32089
- DECOMPRESSION SICKNESS**
HeO2 saturation dives to verify no-decompression repetitive excursion format of Deep Submergence Systems project [AD-723172] N71-32602
Repetitive excursion dives from saturated depths using helium-oxygen mixtures to eliminate decompression sickness [AD-723173] N71-32632
No-decompression repetitive excursion dive format testing at 150 and 200 ft using helium-oxygen mixtures [AD-723171] N71-32770
- DECONTAMINATION**
Planetary quarantine, decontamination, microbial release probabilities, and contamination logs for Venus and Mars [NASA-CR-121423] N71-33221
- DEMINEERALIZING**
Effects of prolonged bed rest on bone and calcium metabolism and mineral content loss of os calcis N71-33267
- DENSITY (MASS/VOLUME)**
Measurement of bone density loss during manned space flight N71-33254
Long term bed rest effects on mineral balance and bone density in normal individuals N71-33266
- DENSITY MEASUREMENT**
Rat body fat, water and density measurements by dilution method and air displacement technique, comparing to determination by direct chemical analysis upon sacrificing A71-38555
Nondestructive measurement of density, breaking strength, and modulus of elasticity of bones N71-33261
- DIASTOLE**
Diastolic heart sounds and filling waves in coronary artery disease, relating graphic abnormalities and clinical, arteriographic and hemodynamic findings A71-37550
Pulmonary diastolic pressure relation to left ventricle and atrium of patient with diagnostic heart catheterization at rest A71-38296
- DIETS**
Food utility calculation for various formose sugar treatments as valid qualitative measure of relative effects of dietary materials A71-37575
- DIFFERENTIAL EQUATIONS**
Signal propagation in model neuron network in terms of differential equations system, representing retina major cell types in planar model A71-38276
- DIFFERENTIATION (BIOLOGY)**
Radiation effects on cytoplasmic structure and differential activity of genes [NYO-2356-43] N71-33934
- DIFFUSION**
Diffusion component of alveolar-arterial oxygen pressure differences in man at rest and during exercise A71-38556
- DIFFUSION COEFFICIENT**
Integral operating mode of nerve paths representation by linear diffusion channel with electrochemically active synapses, deriving complementary partial differential equations A71-37250
- DISPLAY DEVICES**
Analog computer program and display device for

detecting arrhythmia signals during
electrocardiography
[AD-711039] N71-31612

Mathematical model and information display system
for flight control and monitoring aircraft and
pilot performance
[AD-723051] N71-32566

Human factors engineering in optimizing visual
perception of sonar and radar displays
[AD-723992] N71-33187

DIVING (UNDERWATER)

Repetitive excursion dives from saturated depths
using helium-oxygen mixtures to eliminate
decompression sickness
[AD-723173] N71-32632

No-decompression repetitive excursion dive format
testing at 150 and 200 ft using helium-oxygen
mixtures
[AD-723171] N71-32770

Revised tables for conversion of water depth and
partial pressure combinations into appropriate
oxygen percentages for diver decompression
[AD-724282] N71-33125

DOCUMENTS

Cross-referenced directory of reports of Human
Engineering Laboratories 1953 to 1970
N71-31617

DOGS

Abdominal and head shielding effects on blood
serum protein metabolism of gamma irradiated
dogs
N71-33457

DOPPLER EFFECT

Monograph on blood flow rates instantaneous
measurement from ultrasound signals of Doppler
flowmeter, discussing steady laminar flow test
results
A71-39262

DRUGS

Physical training, cold adaptation, and adaptogen
pharmaceutica for increased physiological stress
resistance in rats
N71-33454

DRY HEAT

Bacterial spore distribution and dry heat
resistance on Mariner-Mars 1969 spacecraft,
using randomly selected aerobic mesophilic
isolates
A71-37646

DYNAMIC MODELS

Activation impulse blocking in nerve, using
inhomogeneous Lillie electrochemical model
A71-37282

Pulmonary nitrogen washout and carbon monoxide
uptake, developing dynamic mathematical models
for volume and distensibility distributions in
airways and alveoli
A71-39441

DYNAMIC RESPONSE

Human dynamic response to impact acceleration
minus $G_{sub} x$ - measurements on head and neck
[AD-717130] N71-31616

E

EAR

Ear inherent channel capacity estimation by
applying Shannon equations for binary signal
transmission
A71-39769

EAR PROTECTORS

Bibliography of literature on environmental
pollution, noise pollution, and ear protection
devices
[AD-724650] N71-33088

EARTH HYDROSPHERE

Approaches to biogeocenotic research based on
internal dynamic organization and phenomena
which ultimately determine the laws of life of
the biosphere
N71-33503

Investigation of tundra biogeocenoses noting
species saturation of surface layer and soil and
eleven phases of turnover
N71-33504

Analysis of natural zones and space ecosystems
noting relationships of living animals and
biosphere
N71-33505

EATING

Relationship between diurnal and meal driven
excretory patterns in human kidney during bed
rest
N71-33268

ECOLOGY

Analysis and definition of tasks in field of
biogeocenology
N71-33502

Approaches to biogeocenotic research based on
internal dynamic organization and phenomena
which ultimately determine the laws of life of
the biosphere
N71-33503

Applications of radioisotopes in experimental
biogeocenology to determine fertilizer turnover
during growth of crops
N71-33506

Role of individual components of biogeocenosis in
organization of structure and functions
N71-33509

Discussion of photosynthesis process and
production of cenoses
N71-33510

Characteristics of water environment and
relationship to biogeocenology
N71-33511

Effect of solar radiation on energy balance of
biogeocenosis
N71-33512

Application of biogeocenology principles to land
reclamation activities
N71-33513

EDEMA

Rabbit tolerance to pulmonary edema by lung
exposure to low ozone dosage
A71-38558

EDUCATION

Psychological training for personality development
of aircraft stewardesses for conscious passenger
relation establishment
A71-38224

EFFERENT NERVOUS SYSTEMS

Circadian rhythm maturation of brain
norepinephrine and serotonin in rat, relating
spontaneous motor activity and sleep-wakefulness
mechanism
A71-38071

Book on noise effects on man covering audiometry,
aural reflex, hearing damage risk, physiological
responses, motor performance and speech
communication
A71-39874

ELASTIC WAVES

Small pressure wave transmission in abdominal
venae cavae of dogs in mathematical model
development for viscoelastic behavior of large
veins
A71-38987

ELECTRIC POTENTIAL

Intracochlear electric potential of anesthetized
cats recorded with potassium filled glass
micropipets, determining magnitude and phase of
responses
A71-39768

ELECTRIC STIMULI

Long term exposure to electric shock and
associated stimuli on squirrel monkeys,
considering aggressive and manual responses
A71-39070

ELECTROCARDIOGRAPHY

Electrocardiograph electrode placements for best
R-wave amplitude correlation with respiratory
volume
[AD-713833] N71-31614

Electrocardiographic monitoring device with
arrhythmia signal detector and steplike output
of R-wave amplitudes
[AD-712668] N71-31622

ELECTROCHEMICAL CELLS

Integral operating mode of nerve paths
representation by linear diffusion channel with
electrochemically active synapses, deriving
complementary partial differential equations
A71-37250

ELECTROCHEMISTRY

Activation impulse blocking in nerve, using
inhomogeneous Lillie electrochemical model
A71-37282

ELECTRODES

Electrocardiograph electrode placements for best R-wave amplitude correlation with respiratory volume
[AD-713833] N71-31614

ELECTROENCEPHALOGRAPHY

Human EEG changes and motor analyzer activity during mental visualization of motions
A71-37445

Electroencephalographic evaluation of brain functions disturbances in response to stress in flying personnel, relating fatigue and rest periods allocation
A71-38223

Regional cerebral blood flow, tissue oxygen, EEG activity and behavioral reaction at high pressure
A71-38557

Medical, zoological and biological effects of ELF signals in atmosphere, comparing with EEG alpha and gamma rhythm
A71-39478

ELECTROLYTE METABOLISM

High altitude exposure effects on concentration and total quantity of electrolytes in human serum and extracellular space
A71-38562

Renal sodium and calcium excretion effects on human electrolytic water-mineral metabolism during space flight
N71-33467

ELECTROMECHANICAL DEVICES

Automatic regulation of volumetric blood flow rate during artificial blood circulation, using electromechanical system for controlling arterial pump of cardiopulmonary machine
A71-38641

ELECTROMYOGRAPHY

Human respiratory muscles electrical activity, discussing correlation analysis of interferential electromyograms from external intercostal muscles during breathing exercises
A71-38198

Shin muscle electrical activity during standing after 120 day bed rest hypokinesia from EMG measurement
A71-39230

ELECTRON MICROSCOPES

Preparation of biochemical materials for electron microscopy
[ISS-70/8] N71-32968

ELECTRORETINOGRAPHY

Positive and negative deflections in human electroretinogram off response to stimuli
A71-38058

Spectral sensitivity and dominance of color center cones in macaque monkeys based on flicker electroretinography
[IZF-1971-10] N71-33823

EMOTIONAL FACTORS

Literature survey of nervous-emotional stress effects on pilot during flight, discussing premature fatigue, cardiovascular disorders, psychic disturbances and circadian rhythms
A71-37763

ENVIRONMENT POLLUTION

Bibliography of literature on environmental pollution, noise pollution, and ear protection devices
[AD-724650] N71-33088

Development of scientific principles of protecting and transforming nature for improving environment and optimal use of natural conditions
[JPRS-53743] N71-33501

ENVIRONMENTAL ENGINEERING

Development of scientific principles of protecting and transforming nature for improving environment and optimal use of natural conditions
[JPRS-53743] N71-33501

Analysis and definition of tasks in field of biogeocenology
N71-33502

ENVIRONMENTAL TESTS

Human psychomotor performance measurements in rotating environments, using Langley complex coordinator and decision response time devices
[AIAA PAPER 71-887] A71-37275

Noisy environment effects on circulatory, respiratory and metabolic parameters during physical exercise, measuring heart rate, systolic blood pressure, oxygen intake and respiratory quotient
A71-38889

ENZYME ACTIVITY

Chlorella extracellular metabolites, identifying indole nature biologically active substances
A71-38544

Phosphoenolpyruvate as enzyme inhibitor of phosphoribulokinase in Pseudomonas facilis with respect to ribulose-5-phosphate and ATP
A71-38820

Plasma renin activity in hypertonic and normotonic persons exposed to exogenous stress, comparing with measurements at rest and in orthostasis
A71-38893

Abundance, persistence, and localization of enzyme activity in terrestrial soil and exploration of soils suitable for planetary life
[NASA-CR-121446] N71-33232

EPINEPHRINE

Renin, plasma norepinephrine and epinephrine responses to work loads of various intensities, evaluating sympathetic nervous system as stimulus for secretion
A71-38551

EQUIPMENT SPECIFICATIONS

Human factors engineering for man machine systems
N71-32622

EROSION

Spore release from solid materials by aeolian erosion on planetary surface
[NASA-CR-121422] N71-33380

ERYTHROCYTES

Physiological responses of burro Equus asinus to oxygen lack in mountain altitudes, studying red blood cell and plasma volumes
A71-38560

Chronic hypercapnia effects on oxygen affinity and 2,3-diphosphoglycerate in red cell from tests on guinea pigs
A71-39440

Red cell mass and plasma volume changes noted in hypodynamic states of bed rest and water immersion compared to changes observed during earth orbital missions
N71-33253

Red cell mass loss in human beings as result of bed rest
N71-33271

ESOPHAGUS

Dogs intrapleural and intraesophageal pressures dependence on head positions
A71-38564

EXCRETION

Relationship between diurnal and meal driven excretory patterns in human kidney during bed rest
N71-33268

EXERCISE (PHYSIOLOGY)

Daily endurance exercise influence on key tissues resting aerobic metabolism, using Warburg technique to determine rats heart, skeletal muscle and liver tissue oxygen consumption
A71-38886

Alkalosis effect on human maximal performance and lactic acid formation in blood under supraaxial exercise conditions
A71-38888

Postexercise elevated tissue temperatures contributions to oxygen consumption in rats, suggesting hypothalamic adjustment
A71-38981

Total body exercise effect on metabolic, hematologic, and cardiovascular consequences of prolonged bed rest
N71-33265

EXOBIOLOGY

Abundance, persistence, and localization of enzyme activity in terrestrial soil and exploration of soils suitable for planetary life
[NASA-CR-121446] N71-33232

Medical and biological problems of prolonged manned space flight
[JPRS-53801] N71-33451

EXPERIMENTAL DESIGN

Mineral composition optimization of nutrient

medium for *Hydrogenomonas*, using steepest ascent method for mathematical planning of experiments
A71-39236

EXTRATERRESTRIAL LIFE
Automatic analysis system for separating and identifying amino acids to detect extraterrestrial life
[NASA-TT-F-13765] N71-32232

EXTRATERRESTRIAL MATTER
Abundance, persistence, and localization of enzyme activity in terrestrial soil and exploration of soils suitable for planetary life
[NASA-CR-121446] N71-33232

EXTRAVEHICULAR ACTIVITY
Human response to space environment, discussing prolonged weightlessness, extravehicular work and lunar surface activity
A71-37492

EXTREMELY LOW RADIO FREQUENCIES
Medical, zoological and biological effects of ELF signals in atmosphere, comparing with EEG alpha and gamma rhythms
A71-39478

EYE (ANATOMY)
Visual sensations produced by cosmic ray muons passing in different directions through human eyes and head
A71-38677

EYE EXAMINATIONS
Intraocular pressure distribution measurements on healthy subjects engaged in mental work
N71-33469

EYE MOVEMENTS
Firing frequency of single trochlear nerve fibers during eye movements in alert monkey
A71-37413

Extraretinal correction and memory for target position, suggesting corrective tendency of eye movements in dark
A71-38286

F

FATS
Hamster body fat, water and density measurements by dilution method and air displacement technique, comparing to determination by direct chemical analysis upon sacrificing
A71-38555

Cholesterol and esterified cholesterol distribution in human skin from analysis on fat, epidermis, corium, subcutaneous tissue and serum by chromatographic/colorimetric methods
A71-38892

FERTILITY
Application of microbial cenoses to problems of soil fertility
N71-33507

FIRES
Performance of protective clothing in large J4-4 fuel fires
[AD-724648] N71-32925

FLASH
Apollo astronauts light flashes observation during lunar flight, discussing interpretation as scintillations in eye lens by multiply charged cosmic rays focusing on retina
A71-37299

FLIGHT CONDITIONS
Physiological responses of inexperienced private pilots to cross-country flying
[FAA-AM-71-23] N71-32082

Determination and application of aeromedical standards to occupant selection, aircraft design features, and operational guidelines for spacecraft design
[FAA-AM-71-33] N71-32083

FLIGHT CONTROL
Mathematical model and information display system for flight control and monitoring aircraft and pilot performance
[AD-723051] N71-32566

FLIGHT CREWS
Ergonomic evaluation of flight crew working conditions from viewpoint of static and dynamic adaptation of aircraft system design to human psychophysical capabilities
A71-38016

Aircraft noise effect on hearing impairment of cockpit crews in civil aviation, using audiometric evaluation
A71-38222

Aircraft recognition accuracy and decision speed comparing single observers and four-man crews
[AD-714213] N71-31625

Use of new philosophy of total learning process for improved crew member training
[AD-723313] N71-31741

FLIGHT FATIGUE
Electroencephalographic evaluation of brain functions disturbances in response to stress in flying personnel, relating fatigue and rest periods allocation
A71-38223

FLIGHT SIMULATION
Aircraft recognition accuracy and decision speed comparing single observers and four-man crews
[AD-714213] N71-31625

FLIGHT STRESS (BIOLOGY)
Literature survey of nervous-emotional stress effects on pilot during flight, discussing premature fatigue, cardiovascular disorders, psychic disturbances and circadian rhythms
A71-37763

Electroencephalographic evaluation of brain functions disturbances in response to stress in flying personnel, relating fatigue and rest periods allocation
A71-38223

FLIGHT TESTS
Helicopter pilot visual acuity determined from flight tests
[ISVR-TR-44] N71-31660

FLIGHT TRAINING
Use of new philosophy of total learning process for improved crew member training
[AD-723313] N71-31741

Development of multivariate system for evaluating potential effectiveness of military aviation personnel during training
[AD-724696] N71-33148

Development of procedure for predicting success of personnel in military aviation training
[AD-724695] N71-33149

FLOW RESISTANCE
Potassium concentrations and osmolality levels changes effects on vascular resistance in subcutaneous adipose tissue blood flow
A71-39379

FLOW VELOCITY
Automatic regulation of volumetric blood flow rate during artificial blood circulation, using electromechanical system for controlling arterial pump of cardiopulmonary machine
A71-38641

Monograph on blood flow rates instantaneous measurement from ultrasound signals of Doppler flowmeter, discussing steady laminar flow test results
A71-39262

FLYING PERSONNEL
Electroencephalographic evaluation of brain functions disturbances in response to stress in flying personnel, relating fatigue and rest periods allocation
A71-38223

Psychological training for personality development of aircraft stewardesses for conscious passenger relation establishment
A71-38224

Problem solving task for mental ability assessment in selection of aviation personnel
[FAA-AM-71-28] N71-32434

Development of multivariate system for evaluating potential effectiveness of military aviation personnel during training
[AD-724696] N71-33148

Development of procedure for predicting success of personnel in military aviation training
[AD-724695] N71-33149

FOOD
Food utility calculation for various formose sugar treatments as valid qualitative measure of relative effects of dietary materials
A71-37575

FOOD INTAKE
Chronic centrifugation effects on water intake and

urine output in mice, considering food intake and growth rate

A71-38984

FOREARM

Forearm vascular responses to brachial artery infusions of tyramine and norepinephrine after two weeks bed rest

N71-33264

FOVEA

Increment thresholds for foveally viewed square and circular visual stimuli, suggesting availability of more than one spatial integration pattern

A71-38277

Detectability measurement of foveal stimulus, suggesting nonuniformity of retinal illuminance in visual task

A71-38278

Surround luminance effect on relative perceptual latency of response, using test stimuli confined to rod free area of fovea

A71-38774

FREQUENCY DISTRIBUTION

Frequency distribution of heart sounds in precordium, studying slope of attenuation and relative peaking

A71-38803

FREQUENCY MODULATION

Cortical responses of awake cat to narrow-band FM noise stimuli, proposing neuronal model

A71-39767

G

GAMMA RAYS

Comparative abdomen and head shield effect during gamma irradiation of dogs on protein fractions in blood serum, noting increased globulins and glutamate aspartate transferases

A71-39222

Combined action of vibration and gamma irradiation on sporulation dynamics, survival rate and mutability of *Chlorella*

A71-39237

Abdominal and head shielding effects on blood serum protein metabolism of gamma irradiated dogs

N71-33457

GAS ANALYSIS

Simultaneous calibration of gas analyzers and meters for continuous process gas stream composition monitoring

A71-38566

GAS LASERS

Retinal damage thresholds of rhesus monkeys to ocular radiation from yellow line 568.2 nm emitted by krypton CW gas laser

A71-38284

GAS METERS

Simultaneous calibration of gas analyzers and meters for continuous process gas stream composition monitoring

A71-38566

GAS MIXTURES

No-decompression repetitive excursion dive format testing at 150 and 200 ft using helium-oxygen mixtures

N71-32770

GELS

Amino silica gels absorption properties with respect to carbon dioxide, hydrogen sulfide and water vapor, comparing affinity

A71-39233

Amino silica gel absorbers for atmospheric purification systems of spacecraft cabins

N71-33468

GEMINI 7 FLIGHT

Metabolic balance studies of two astronauts during 10 day preflight phase, Gemini 7 flight of 14 days, and 4 day postflight recovery phase

N71-33255

GENETICS

Radiation effects on cytoplasmic structure and differential activity of genes

N71-33934

GLOBULINS

Comparative abdomen and head shield effect during gamma irradiation of dogs on protein fractions in blood serum, noting increased globulins and

glutamate aspartate transferases

A71-39222

GLOVES

Design and fabrication of viton gloves for use in sterile nitrogen atmospheric processing cabinet of Lunar Receiving Laboratory

N71-31608

GLUCOSE

Heart rate variation during and after muscular exercise, discussing correlated measurements of rectal and mean skin temperatures, blood lactate, pyruvate and glucose

A71-38891

Bed rest effects on glucose regulation in human beings

N71-33270

GLUTAMATES

Comparative abdomen and head shield effect during gamma irradiation of dogs on protein fractions in blood serum, noting increased globulins and glutamate aspartate transferases

A71-39222

GLUTAMINE

Amino acid levels in fasted and fed rats plasma, liver, muscle and kidney during and after exercise, noting glutamine decrease in liver tissue

A71-38982

GLYCOGENS

High muscle glycogen content effect on human performance in prolonged heavy physical exercise

A71-38554

GRAVITATIONAL EFFECTS

Motor and vestibular analysors and frontal hypothalamus role in gravitational loads compensation during orthostasis, noting respiration, arterial pressure and brain bioelectric activity changes

A71-39223

Medical and biological problems of prolonged manned space flight

N71-33451

Compensatory capabilities of vestibules, hypothalamus, and central nervous system toward gravitational effects on cats during orthostasis

N71-33458

GROWTH

Chronic centrifugation effects on water intake and urine output in mice, considering food intake and growth rate

A71-38984

GUINEA PIGS

Angular acceleration effects on guinea pig vestibular nystagmus

N71-33473

GUNFIRE

UH-1P helicopter acoustic measurements during gunfire and rocket firing including bioacoustic factors

N71-31613

H

HABITUATION (LEARNING)

Visual attention automatization due to repeated stimulus experience, noting fixation rate habituation concomitance with fixations spatial distribution uncertainty reduction

A71-39545

HALOGENATION

Spontaneous cardiac arrhythmias induced by bromotrifluoromethane in monkeys

N71-31733

HEAD (ANATOMY)

Dogs intrapleural and intraesophageal pressures dependence on head positions

A71-38564

Visual sensations produced by cosmic ray muons passing in different directions through human eyes and head

A71-38677

Mechanical responses of human head subjected to acceleration loads determined for use in construction of artificial head

N71-32547

HEARING

Book on noise effects on man covering audiometry, aural reflex, hearing damage risk, physiological responses, motor performance and speech

- communication A71-39874
- Psychophysical evidence of lateral inhibition in hearing [12F-1971-8] N71-33859
- HEART DISEASES**
- Frequency phonocardiography technique for heart sounds and murmurs registration, producing analog voltage proportional to frequency by zero crossing detector A71-37234
- Diastolic heart sounds and filling waves in coronary artery disease, relating graphic abnormalities and clinical, arteriographic and hemodynamic findings A71-37550
- Dystrophic myocardial damage in rat hearts caused by prolonged acceleration N71-33470
- HEART FUNCTION**
- First heart sound changes, discussing sound vibration and transmission and cardiac function A71-37232
- Second heart sound changes due to position and magnitude variations of aortic or pulmonary component A71-37233
- Frequency phonocardiography technique for heart sounds and murmurs registration, producing analog voltage proportional to frequency by zero crossing detector A71-37234
- Noradrenaline concentration in myocardium of rats subjected to high altitude hypoxia, considering heart regulation in presence of hyperfunction and hypertrophy A71-37393
- Analog computer analysis of radiocardiograms, determining cardiac function and pulmonary blood volume A71-38802
- Frequency distribution of heart sounds in precordium, studying slope of attenuation and relative peaking A71-38803
- Heart maximal aerobic and anaerobic power and stroke volume, discussing cardiac output and blood oxygen capacity measurements in subalpine population subjects A71-38887
- Isoproterenol, atrial pacing, ouabain and methoxamine effects on dogs during experimental cardiac tamponade, observing arterial pressure, cardiac output and heart rate changes A71-38968
- Polycythemia and altitude hypoxia effects on rats heart and sea level exercise tolerance A71-38980
- Bed rest effects on human hemodynamic and gaseous metabolism, observing increased cardiac output and decreased oxygen consumption and carbon dioxide production A71-39231
- HEART MINUTE VOLUME**
- Right and left heart and pulmonary blood volume determination, using radiocardiograms and analog computer analysis A71-38801
- Heart maximal aerobic and anaerobic power and stroke volume, discussing cardiac output and blood oxygen capacity measurements in subalpine population subjects A71-38887
- Hypokinesia effects on human heart rate and output volume after prolonged bed rest N71-33466
- HEART RATE**
- Maximum oxygen uptake measurement by two techniques, calculating heart rate A71-38553
- World champion marathon runner metabolic responses during submaximal and maximal treadmill running, recording oxygen consumption, heart rate and lactic acid A71-38890
- Heart rate variation during and after muscular exercise, discussing correlated measurements of rectal and mean skin temperatures, blood lactate, pyruvate and glucose
- Isoproterenol, atrial pacing, ouabain and methoxamine effects on dogs during experimental cardiac tamponade, observing arterial pressure, cardiac output and heart rate changes A71-38891
- Hypokinesia effects on human heart rate and output volume after prolonged bed rest A71-38968
- HEAT TRANSFER**
- Thermal behavior simulation of cooling biological system, describing heat generation and transfer at normothermic to hibernating body temperatures with mathematical model A71-38199
- Cold climate clothed human windchill tables, considering various heat transfer modes and skin temperature A71-39205
- Anatomical-physiological characteristics of heat transfer in human body for developing insulating suit N71-33459
- HELIUM**
- HeO2 saturation dives to verify no-decompression repetitive excursion format of Deep Submergence Systems project [AD-723172] N71-32602
- Repetitive excursion dives from saturated depths using helium-oxygen mixtures to eliminate decompression sickness [AD-723173] N71-32632
- HELMETS**
- Protective features and compatibility with airborne communication systems considered in study of aviation helmets [AD-724080] N71-33123
- HEMATOLOGY**
- Total body exercise effect on metabolic, hematologic, and cardiovascular consequences of prolonged bed rest N71-33265
- Red cell mass loss in human beings as result of bed rest N71-33271
- HEMODYNAMIC RESPONSES**
- Bed rest effects on human hemodynamic and gaseous metabolism, observing increased cardiac output and decreased oxygen consumption and carbon dioxide production A71-39231
- Hemodynamic and body fluid alterations induced by varying periods of bed rest N71-33263
- HEMOGLOBIN**
- Oxygen uptake kinetics by hemoglobin layers, using Hill advancing front equation A71-38567
- HIBERNATION**
- Thermal behavior simulation of cooling biological system, describing heat generation and transfer at normothermic to hibernating body temperatures with mathematical model A71-38199
- Autoclave chronic catheter system and restraining box for blood sampling and pressure measurement for hibernating marmots A71-38568
- HIGH ALTITUDE BREATHING**
- Noradrenaline concentration in myocardium of rats subjected to high altitude hypoxia, considering heart regulation in presence of hyperfunction and hypertrophy A71-37393
- HIGH ALTITUDE ENVIRONMENTS**
- Environmental radiation exposure in air travel, comparing integral radiation dosages for conventional jet transport aircraft and SST A71-38976
- HIGH SPEED**
- Pilot injuries on high speed low altitude flight noting acceleration due to gust effects N71-31888
- HOLOGRAPHY**
- Holographic scanning for acoustic imaging in liquid sodium [BNWL-1558] N71-33486
- HORMONE METABOLISMS**
- Long term hypokinesia effects on rat serotonin

HUMAN BEINGS

SUBJECT INDEX

metabolism N71-33453

HUMAN BEINGS

Bed rest effects on glucose regulation in human beings N71-33270

HUMAN BODY

Radioactive dilution estimation of total skeletal mass in human body N71-33259

Bed rest and immobilization effects on oxygen transport system of human body N71-33262

Dynamic mathematical model of physiological regulation of body temperature in human beings [NASA-CR-1855] N71-33401

Anatomical-physiological characteristics of heat transfer in human body for developing insulating suit N71-33459

Prolonged bed rest effects on human chromosomes during space flight simulation and actual space flight N71-33462

Transverse acceleration effects on blood flow in human retina N71-33463

Hypokinesia effects on nasal blood circulation of man N71-33464

Hypokinesia effects on myoelectric potential of human leg muscle after prolonged bed rest N71-33465

Hypokinesia effects on human heart rate and output volume after prolonged bed rest N71-33466

Renal sodium and calcium excretion effects on human electrolytic water-mineral metabolism during space flight N71-33467

Intraocular pressure distribution measurements on healthy subjects engaged in mental work N71-33469

Anthropometric methods for determining psychic and physical stresses caused by vibration effects on human body [DLR-HITT-70-11] N71-33970

HUMAN FACTORS ENGINEERING

Ergonomic evaluation of flight crew working conditions from viewpoint of static and dynamic adaptation of aircraft system design to human psychophysical capabilities A71-38016

Physicotechnical and biomedical aspects of human efficiency under weightlessness, discussing physical exercise role in adaptation A71-39217

Cross-referenced directory of reports of Human Engineering Laboratories 1953 to 1970 N71-31617

Mathematical models of vision process, relationship between memory and perception, and development of improved computer technology [JPRS-53647] N71-32012

Numerical analysis and mathematical models to describe vision process N71-32013

Analysis of registering structure as memory model and role in perception processes N71-32014

Effect of unidirectional movements of total optical environment on spatial disorientation with respect to external visual reference points [FAA-AM-71-22] N71-32081

Determination and application of aeromedical standards to occupant selection, aircraft design features, and operational guidelines for spacecraft design [FAA-AM-71-33] N71-32083

Dynamic reactions of operators with random vibrational stimuli and biomechanical systems N71-32090

Mechanical responses of human head subjected to acceleration loads determined for use in construction of artificial head N71-32547

Human factors engineering for man machine systems N71-32622

Human factors engineering in optimizing visual perception of sonar and radar displays [AD-723992] N71-33187

HUMAN PERFORMANCE

Human psychomotor performance measurements in rotating environments, using Langley complex coordinator and decision response time devices [AIAA PAPER 71-887] A71-37275

Positive and negative deflections in human electroretinogram off response to stimuli A71-38058

High muscle glycogen content effect on human performance in prolonged heavy physical exercise A71-38554

Alkalosis effect on human maximal performance and lactic acid formation in blood under supramaximal exercise conditions A71-38888

Noise exposure effects on human physiological and psychological functions and performance A71-38959

Physicotechnical and biomedical aspects of human efficiency under weightlessness, discussing physical exercise role in adaptation A71-39217

Color and music distraction for operator in isolated environment and counteract psychophysiological activity impairment A71-39225

Approach indicator oscillation and illuminating effects on human performance of compensatory tracking tasks [NASA-CR-119640] N71-31618

Human performance and recovery in man machine systems of continuous operations and work/rest schedules [AD-723430] N71-32331

Analysis of cerebral slow potentials underlying human attentive processes in central nervous system [NASA-CR-121409] N71-33437

Medical and biological problems of prolonged manned space flight [JPRS-53801] N71-33451

Weightlessness effects on human sensorimotor performance and locomotion N71-33452

HUMAN REACTIONS

Human response to auditory stimuli start and cessation, noting time lag and perception duration A71-37283

Conditioned motor reactions characterizing higher nervous activity, using logokinetic method A71-37447

Human heat stress evaluation indices, discussing acclimatization, dehydration, clothing, age, physical fitness, health and sex effects A71-37483

Human response to space environment, discussing prolonged weightlessness, extravehicular work and lunar surface activity A71-37492

Visually evoked cerebral cortex responses to on- and off-set of patterned light and contour density and sharpness in humans A71-38282

Bed rest effects on human hemodynamic and gaseous metabolism, observing increased cardiac output and decreased oxygen consumption and carbon dioxide production A71-39231

Book on noise effects on man covering audiometry, aural reflex, hearing damage risk, physiological responses, motor performance and speech communication A71-39874

Physiological effects of two levels of alcohol on vertigo and nystagmus responses resulting from caloric irrigations with visual conditions and alertness of subjects controlled [FAA-AM-71-6] N71-32079

Physiological responses of inexperienced private pilots to cross-country flying [FAA-AM-71-23] N71-32082

Human reactions to sleep deprivation by simulated sonic booms [ISVR-TR-41] N71-32865

SUBJECT INDEX

IMPACT ACCELERATION

- Prediction of human reaction time to light flashes
[AD-724001] N71-33087
Color and music effects on humans during prolonged
isolation in confined space N71-33460
- HUMAN TOLERANCES**
Human dynamic response to impact acceleration
minus G sub x - measurements on head and neck
[AD-717130] N71-31616
Physiological effects of two levels of alcohol on
vertigo and nystagmus responses resulting from
caloric irrigations with visual conditions and
alertness of subjects controlled N71-32079
[FAA-AM-71-6]
- HUMAN WASTES**
Circadian rhythms of human renal excretions in
polar, temperate and equatorial regions A71-39477
- HYDRAULIC TEST TUNNELS**
Visual operational problems and sound absorption
in porous walls of hydraulic test tunnels
[IZP-1971-12] N71-33725
- HYDROGEN SULFIDE**
Amino silica gels absorption properties with
respect to carbon dioxide, hydrogen sulfide and
water vapor, comparing affinity A71-39233
- HYDROGENOMONAS**
Mineral composition optimization of nutrient
medium for Hydrogenomonas, using steepest ascent
method for mathematical planning of experiments
A71-39236
Optimal mineral composition in nutrient for
autotrophic Hydrogenomonas cultivation N71-33471
- HYDROSTATIC PRESSURE**
Deconditioning and its prevention by simulating
hydrostatic gradient by use of cardiovascular
conditioning suit N71-33274
- HYPERCAPNIA**
Chronic hypercapnia effects on oxygen affinity and
2,3-diphosphoglycerate in red cell from tests on
guinea pigs A71-39440
- HYPEROXIA**
Cerebral gamma-aminobutyric acid metabolism and
hyperbaric oxygen induced seizures in chicks
during brain development, noting increased
membrane permeability A71-38970
- HYPERTENSION**
Plasma renin activity in hypertonic and normotonic
persons exposed to exogenous stress, comparing
with measurements at rest and in orthostasis
A71-38893
- HYPERVENTILATION**
Alveolar-arterial oxygen pressure difference
during controlled hyperventilation and
posthyperventilatory phase A71-38200
- HYPODYNAMIA**
Measurement of changes in musculoskeletal system
under hypodynamic and hypogravic conditions
N71-33257
- HYPOKINESIA**
Prolonged hypokinesia effect on rats serotonin
/5-HT/ metabolism, noting pronounced blood
content deviation from normal during first to
third and thirteenth to fifteenth day A71-39218
Nasal vascular system reactions during 120-day bed
rest hypokinesia under drug affected metabolism
A71-39229
Shin muscle electrical activity during standing
after 120 day bed rest hypokinesia from EMG
measurement A71-39230
Long term hypokinesia effects on rat serotonin
metabolism N71-33453
Prolonged bed rest effects on human chromosomes
during space flight simulation and actual space
flight N71-33462
Hypokinesia effects on nasal blood circulation of
man N71-33464
- Hypokinesia effects on myoelectric potential of
human leg muscle after prolonged bed rest
N71-33465
Hypokinesia effects on human heart rate and output
volume after prolonged bed rest N71-33466
- HYPOTHALAMUS**
Postexercise elevated tissue temperatures
contributions to oxygen consumption in rats,
suggesting hypothalamic adjustment A71-38981
Motor and vestibular analysors and frontal
hypothalamus role in gravitational loads
compensation during orthostasis, noting
respiration, arterial pressure and brain
bioelectric activity changes A71-39223
- HYPOXIA**
Noradrenaline concentration in myocardium of rats
subjected to high altitude hypoxia, considering
heart regulation in presence of hyperfunction
and hypertrophy A71-37393
Physiological responses of burro Equus asinus to
oxygen lack in mountain altitudes, studying red
blood cell and plasma volumes A71-38560
Polycythemia and altitude hypoxia effects on rats
heart and sea level exercise tolerance A71-38980
Respiratory chemoreceptors and acid-base
alterations effects on adrenocortical activation
during hypoxia in dogs A71-38986
- ILLUMINANCE**
Detectability measurement of foveal stimulus,
suggesting nonuniformity of retinal illuminance
in visual task A71-38278
Color and illuminance effects on visual space
perception
[AD-724623] N71-33138
- ILLUMINATING**
Approach indicator oscillation and illuminating
effects on human performance of compensatory
tracking tasks
[NASA-CR-119640] N71-31618
- IMAGE CONTRAST**
Visual system image blur and lateral inhibition
effects on visual performance, convolving
luminance profiles of targets with point spread
functions A71-38059
- IMAGE CONVERTERS**
Synthesis of optimal search scanning systems using
special filament optical image converters N71-32034
- IMAGING TECHNIQUES**
Astronomical telescopes image motion, distortion
and scintillation, examining atmospheric
refractive index and density/temperature
variation effects A71-38571
Holographic scanning for acoustic imaging in
liquid sodium
[BNWL-1558] N71-33486
- IMMOBILIZATION**
Measurement of bone mass loss as result of
immobilization N71-33256
Effects of inactivity or immobilization on bone
loss N71-33258
Atrophy in monkeys due to immobilization and
implications for extended manned space flight
N71-33260
Bed rest and immobilization effects on oxygen
transport system of human body N71-33262
Research and development, weightlessness
simulation, calcium metabolism, manned space
flight, pressure suits, immobilization, and
aerospace medicine N71-33275
- IMPACT ACCELERATION**
Human dynamic response to impact acceleration

INDOLES

- minus G sub x - measurements on head and neck
[AD-717130] N71-31616
- INDOLES**
Chlorella extracellular metabolites, identifying indole nature biologically active substances
A71-38544
- INFORMATION SYSTEMS**
Mathematical model and information display system for flight control and monitoring aircraft and pilot performance
[AD-723051] N71-32566
- INFORMATION THEORY**
Ear inherent channel capacity estimation by applying Shannon equations for binary signal transmission
A71-39769
- INHIBITORS**
Phosphoenolpyruvate as enzyme inhibitor of phosphoribulokinase in pseudomonas facilis with respect to ribulose-5-phosphate and ATP
A71-38820
- INJURIES**
Pilot injuries on high speed low altitude flight noting acceleration due to gust effects
N71-31888
- INTELLECT**
Three phase code transformation task reliability and correlation, representing general factor analytic intellectual abilities and personality characteristics
A71-39073
- INTERPLANETARY NAVIGATION**
Planetary quarantine constraint effect on multiple outer planet missions, considering navigation error sources and midcourse maneuvers
[AAS PAPER 71-122] A71-37917
- INTESTINES**
Cell contacts in canine duodenal smooth muscle layers, using perfusion with glutaraldehyde fixative
A71-38985
- INTRAOCULAR PRESSURE**
Intraocular pressure distribution of healthy mental workers in 25-40 years age range, noting symmetry
A71-39234
- IONIZING RADIATION**
Book on biological effects of radiation covering ionizing radiation properties and effects at molecular, cellular and tissue levels
A71-38048
- ISOTOPIC LABELING**
Lung scanning, describing moving detectors, electronic apparatus adjustment and choice of radionuclide and labelled compound
A71-39072
- Applications of radioisotopes in experimental biogeocenology to determine fertilizer turnover during growth of crops
N71-33506
- Application of microbic cenoses to problems of soil fertility
N71-33507

J

- JET ENGINE FUELS**
Performance of protective clothing in large J4-4 fuel fires
[AD-724648] N71-32925

K

- KIDNEYS**
Amino acid levels in fasted and fed rats plasma, liver, muscle and kidney during and after exercise, noting glutamine decrease in liver tissue
A71-38982
- Sodium and cations elimination by kidneys during water-salt metabolism changes due to high temperature and hypodynamia
A71-39232
- Relationship between diurnal and meal driven excretory patterns in human kidney during bed rest
N71-33268
- KINEMATICS**
Kinematic analysis and simulation of transmission

SUBJECT INDEX

- modes of sound energy through middle ear
A71-38062
- KRYPTON**
Retinal damage thresholds of rhesus monkeys to ocular radiation from yellow line 568.2 nm emitted by krypton CW gas laser
A71-38284
- L**
- LABYRINTHECTOMY**
Radial acceleration effects on spinal cord induced potentials of intact and labyrinthectomized rats
N71-33456
- LACTATES**
Heart rate variation during and after muscular exercise, discussing correlated measurements of rectal and mean skin temperatures, blood lactate, pyruvate and glucose
A71-38891
- LACTIC ACID**
Alkalosis effect on human maximal performance and lactic acid formation in blood under supramaximal exercise conditions
A71-38888
- World champion marathon runner metabolic responses during submaximal and maximal treadmill running, recording oxygen consumption, heart rate and lactic acid
A71-38890
- LAMINAR FLOW**
Monograph on blood flow rates instantaneous measurement from ultrasound signals of Doppler flowmeter, discussing steady laminar flow test results
A71-39262
- LAND USE**
Application of biogeocenology principles to land reclamation activities
N71-33513
- LEG (ANATOMY)**
Shin muscle electrical activity during standing after 120 day bed rest hypokinesia from EMG measurement
A71-39230
- LEUKOCYTES**
Astronaut chromosome aberrations, presenting peripheral blood leukocytes cytogenetic tests for pre and post space flight
A71-39227
- LIFE RAFTS**
Arctic field tests of prototype life rafts capable of protecting astronauts from cold water exposure for 72 hours
[NASA-CR-121449] N71-33718
- LIFE SUPPORT SYSTEMS**
Medical and biological problems of prolonged manned space flight
[JPRS-53801] N71-33451
- Optimal mineral composition in nutrient for autotrophic Hydrogenomonas cultivation
N71-33471
- Combined vibration and gamma irradiation effects on Chlorella culture yield
N71-33472
- LIGHT (VISIBLE RADIATION)**
Visually evoked cerebral cortex responses to on- and off-set of patterned light and contour density and sharpness in humans
A71-38282
- Retinal damage thresholds of rhesus monkeys to ocular radiation from yellow line 568.2 nm emitted by krypton CW gas laser
A71-38284
- LINEAR SYSTEMS**
Proposed prism adaptation model suggesting visual motor control loop as linear system comprising independent subsystems
A71-37544
- LIQUID SODIUM**
Holographic scanning for acoustic imaging in liquid sodium
[BNWL-1558] N71-33486
- LIVER**
Amino acid levels in fasted and fed rats plasma, liver, muscle and kidney during and after exercise, noting glutamine decrease in liver tissue
A71-38982

Ultrasound absorption in liver tissue due to macromolecular relaxation processes A71-39770

LOCOMOTION
Human EEG changes and motor analyzer activity during mental visualization of motions A71-37445
Weightlessness effects on human sensorimotor performance and locomotion N71-33452

LONG TERM EFFECTS
Human performance and recovery in man machine systems of continuous operations and work/rest schedules [AD-723430] N71-32331
Long term hypokinesia effects on rat serotonin metabolism N71-33453
Color and music effects on humans during prolonged isolation in confined space N71-33460

LOW ALTITUDE
Pilot injuries on high speed low altitude flight noting acceleration due to gust effects N71-31888

LOW FREQUENCIES
Low frequency vibration effects on visual acuity of pilot performing visual task [ISVR-TR-49] N71-32864

LOW TEMPERATURE ENVIRONMENTS
Physiological response of subjects exposed to cold water environment wearing different protective suit assemblies [AD-724617] N71-32907

LOW TEMPERATURE TESTS
Low temperature cytophysiological adaptation of human and mammalian cells N71-33455

LOWER ATMOSPHERE
Approaches to biogeocentotic research based on internal dynamic organization and phenomena which ultimately determine the laws of life of the biosphere N71-33503
Investigation of tundra biogeocenoses noting species saturation of surface layer and soil and eleven phases of turnover N71-33504
Analysis of natural zones and space ecosystems noting relationships of living animals and biosphere N71-33505

LUMINANCE
Visual system image blur and lateral inhibition effects on visual performance, convolving luminance profiles of targets with point spread functions A71-38059
Surround luminance effect on relative perceptual latency of response, using test stimuli confined to rod free area of fovea A71-38774

LUNAR RECEIVING LABORATORY
Design and fabrication of viton gloves for use in sterile nitrogen atmospheric processing cabinet of Lunar Receiving Laboratory [NASA-CR-115112] N71-31608

LUNG MORPHOLOGY
Lung scanning, describing moving detectors, electronic apparatus adjustment and choice of radionuclide and labelled compound A71-39072

LUNGS
Second heart sound changes due to position and magnitude variations of aortic or pulmonary component A71-37233

M

MAMMALS
Mammalian cells cultivation at suboptimal temperatures, considering reproduction and cytophysiological changes A71-39220
Low temperature cytophysiological adaptation of human and mammalian cells N71-33455

MAN MACHINE SYSTEMS
Ergonomic evaluation of flight crew working conditions from viewpoint of static and dynamic adaptation of aircraft system design to human psychophysical capabilities A71-38016
Cybernetics including models for statistical decision making, biomechanical systems, and complex stochastic system N71-32088 [JPRS-53531]
Dynamic reactions of operators with random vibrational stimuli and biomechanical systems N71-32090
Human performance and recovery in man machine systems of continuous operations and work/rest schedules [AD-723430] N71-32331
Human factors engineering for man machine systems N71-32622

MANNED ORBITAL LABORATORIES
Space station biological/medical laboratories, discussing physiology, pathology, hematological, static and dynamic equilibrium, neuropsychic, dietetic, radiobiological, hygiene and prophylaxis departments A71-37308

MANNED SPACE FLIGHT
Conference on aerospace environments, manned space flight, weightlessness simulation, musculoskeletal and cardiovascular systems, bone loss, mineral metabolism, and hematology [NASA-SP-269] N71-33251
Physiological changes in cardiovascular and musculoskeletal systems during manned space flight N71-33252
Red cell mass and plasma volume changes noted in hypodynamic states of bed rest and water immersion compared to changes observed during earth orbital missions N71-33253
Measurement of bone density loss during manned space flight N71-33254
Atrophy in monkeys due to immobilization and implications for extended manned space flight N71-33260
Research and development, weightlessness simulation, calcium metabolism, manned space flight, pressure suits, immobilization, and aerospace medicine N71-33275
Medical and biological problems of prolonged manned space flight [JPRS-53801] N71-33451

MANUAL CONTROL
Spacecraft manual control investigation, using human operator models described by linear transfer function with variable coefficients A71-39226
Mathematical models for control activity of human spaceship operator N71-33461

MARS 69 PROJECT
Bacterial spore distribution and dry heat resistance on Mariner-Mars 1969 spacecraft, using randomly selected aerobic mesophilic isolates A71-37646

MATERIAL ABSORPTION
Amino silica gels absorption properties with respect to carbon dioxide, hydrogen sulfide and water vapor, comparing affinity A71-39233

MATHEMATICAL MODELS
Human operator models parameter estimation by stochastic approximation, considering continuous and sampled data models A71-37648
Cardiovascular system mathematical model for evaluating system parameters effects on circulatory indices including minute volume and arterial tension A71-37777
Signal propagation in model neuron network in terms of differential equations system, representing retina major cell types in planar model A71-38276

- Numerical analysis and mathematical models to describe vision process N71-32013
- Cybernetics including models for statistical decision making, biomechanical systems, and complex stochastic system [JPBS-53531] N71-32088
- Model for quantitatively examining performance of automatic machines with normal and disturbed functions in statistical decision making N71-32089
- Dynamic reactions of operators with random vibrational stimuli and biomechanical systems N71-32090
- Synaptic junction model for memory in brain [NASA-TN-D-6456] N71-32474
- Mathematical model and information display system for flight control and monitoring aircraft and pilot performance [AD-723051] N71-32566
- Dynamic mathematical model of physiological regulation of body temperature in human beings [NASA-CR-1855] N71-33401
- Mathematical models for control activity of human spaceship operator N71-33461
- MEASURING INSTRUMENTS**
- Autoclave chronic catheter system and restraining box for blood sampling and pressure measurement for hibernating marmots A71-38568
- Measuring instruments for in vivo bone mineral content and body composition measurement [NASA-CR-121415] N71-33223
- MECHANICAL PROPERTIES**
- Mechanical responses of human head subjected to acceleration loads determined for use in construction of artificial head N71-32547
- MEDICAL ELECTRONICS**
- Analog computer program and display device for detecting arrhythmia signals during electrocardiography [AD-711039] N71-31612
- MEDICAL EQUIPMENT**
- Radioisotope thermoelectric generators in micro/milliwatt power range for biomedical applications A71-38912
- Cryogenics applications to cryosurgery and long term low temperature storage of living cells and tissues A71-39252
- MEMORY**
- Extraretinal correction and memory for target position, suggesting corrective tendency of eye movements in dark A71-38286
- Mathematical models of vision process, relationship between memory and perception, and development of improved computer technology [JPBS-53647] N71-32012
- Analysis of registering structure as memory model and role in perception processes N71-32014
- Synaptic junction model for memory in brain [NASA-TN-D-6456] N71-32474
- MENTAL PERFORMANCE**
- Human EEG changes and motor analyzer activity during mental visualization of motions A71-37445
- Mental work capacity investigation methodology, including Kekcheev, Kosilov, Zinchenko, Pratusovich and Kraepelin tests A71-37446
- Test equipment for evaluating human higher nervous activity, noting use for radiotelegraphist selection A71-37775
- Intraocular pressure distribution of healthy mental workers in 25-40 years age range, noting symmetry A71-39234
- Problem solving task for mental ability assessment in selection of aviation personnel [FAA-AH-71-28] N71-32434
- METABOLIC WASTES**
- Sodium and cations elimination by kidneys during water-salt metabolism changes due to high temperature and hypodynamia A71-39232
- Renal sodium and calcium excretion effects on human electrolytic water-mineral metabolism during space flight N71-33467
- METABOLISM**
- Noisy environment effects on circulatory, respiratory and metabolic parameters during physical exercise, measuring heart rate, systolic blood pressure, oxygen intake and respiratory quotient A71-38889
- World champion marathon runner metabolic responses during submaximal and maximal treadmill running, recording oxygen consumption, heart rate and lactic acid A71-38890
- Prolonged hypokinesia effect on rats serotonin /5-HT/ metabolism, noting pronounced blood content deviation from normal during first to third and thirteenth to fifteenth day A71-39218
- Metabolic balance studies of two astronauts during 10 day preflight phase, Gemini 7 flight of 14 days, and 4 day postflight recovery phase N71-33255
- Total body exercise effect on metabolic, hematologic, and cardiovascular consequences of prolonged bed rest N71-33265
- Effects of prolonged bed rest on bone and calcium metabolism and mineral content loss of os calcis N71-33267
- Carbohydrate intolerance in human body during two weeks of bed rest N71-33269
- MICROBIOLOGY**
- Application of environmental microbiology to spacecraft quarantine procedures [NASA-CR-119638] N71-31601
- Bibliography of scientific publications and presentations relating to planetary quarantine for year 1970 - Vol. 5 N71-32231
- Analysis of water pollution and application of biogeocenology techniques to eliminate effects of water pollution N71-33508
- MICROWAVES**
- Double standard for national levels of exposure and biological hazards of microwave radiation, comparing Soviet work to U.S. A71-38442
- MIDCOURSE TRAJECTORIES**
- Planetary quarantine constraint effect on multiple outer planet missions, considering navigation error sources and midcourse maneuvers [AAS PAPER 71-122] A71-37917
- MIDDLE EAR**
- Kinematic analysis and simulation of transmission modes of sound energy through middle ear A71-38062
- MILITARY AIRCRAFT**
- Aircraft recognition accuracy and decision speed comparing single observers and four-man crews [AD-714213] N71-31625
- MINERALS**
- Measuring instruments for in vivo bone mineral content and body composition measurement [NASA-CR-121415] N71-33223
- Long term bed rest effects on mineral balance and bone density in normal individuals N71-33266
- MODULUS OF ELASTICITY**
- Nondestructive measurement of density, breaking strength, and modulus of elasticity of bones N71-33261
- MOLECULAR RELAXATION**
- Ultrasound absorption in liver tissue due to macromolecular relaxation processes A71-39770
- MONITORS**
- Electrocardiographic monitoring device with arrhythmia signal detector and steplike output of R-wave amplitudes [AD-712668] N71-31622
- HONKEYS**
- Spontaneous cardiac arrhythmias induced by

- bromotrifluoromethane in monkeys
[AD-723645] N71-31733
- Atrophy in monkeys due to immobilization and
implications for extended manned space flight
N71-33260
- Spectral sensitivity and dominance of color center
cones in macaque monkeys based on flicker
electroretinography
[IZP-1971-10] N71-33823
- MOUNTAIN INHABITANTS**
- Urinary protein excretion rates in high altitude
inhabitants, showing polycythemia effect on
creatinine clearances levels
A71-38561
- MUONS**
- Visual sensations produced by cosmic ray muons
passing in different directions through human
eyes and head
A71-38677
- MUSCLES**
- High muscle glycogen content effect on human
performance in prolonged heavy physical exercise
A71-38554
- Cell contacts in canine duodenal smooth muscle
layers, using perfusion with glutaraldehyde
fixative
A71-38985
- Shin muscle electrical activity during standing
after 120 day bed rest hypokinesia from EMG
measurement
A71-39230
- Active vasodilation in gracilis muscle vascular
bed due to perfusion pressure changes
A71-39378
- Hypokinesia effects on myoelectric potential of
human leg muscle after prolonged bed rest
N71-33465
- MUSCULAR FUNCTION**
- Human respiratory muscles electrical activity,
discussing correlation analysis of
interferential electromyograms from external
intercostal muscles during breathing exercises
A71-38198
- Tissular and cellular biological resistance as
indices for organism resistance to adverse
effects, noting increase due to muscular
training and cold adaptation
A71-39219
- MUSCULOSKELETAL SYSTEM**
- Conference on aerospace environments, manned space
flight, weightlessness simulation,
musculoskeletal and cardiovascular systems, bone
loss, mineral metabolism, and hematology
[NASA-SP-269] N71-33251
- Physiological changes in cardiovascular and
musculoskeletal systems during manned space
flight
N71-33252
- Measurement of changes in musculoskeletal system
under hypodynamic and hypogravic conditions
N71-33257
- Radioactive dilution estimation of total skeletal
mass in human body
N71-33259
- MUSIC**
- Color and music distraction for operator in
isolated environment and counteract
psychophysiological activity impairment
A71-39225
- MUTATIONS**
- Combined action of vibration and gamma irradiation
on sporulation dynamics, survival rate and
mutability of *Chlorella*
A71-39237
- MYOCARDIUM**
- Noradrenaline concentration in myocardium of rats
subjected to high altitude hypoxia, considering
heart regulation in presence of hyperfunction
and hypertrophy
A71-37393
- Canine ventricular myocardium as cardiac beta-
adrenergic receptor, describing binding of
norepinephrine to microsomal particles
A71-37900
- Myocardium reactions under 2G acceleration from
histological, histochemical and electron
microscopic observations on rats, noting
dystrophic damage level relationship to duration
A71-39235
- Dystrophic myocardial damage in rat hearts caused
by prolonged acceleration
N71-33470
- MYOELECTRIC POTENTIALS**
- Hypokinesia effects on myoelectric potential of
human leg muscle after prolonged bed rest
N71-33465
- N**
- NERVES**
- Activation impulse blocking in nerve, using
inhomogeneous Lillie electrochemical model
A71-37282
- NERVOUS SYSTEM**
- Phrenic nerve activity correlation with
ventilation in anesthetized cats, analyzing
relationship between phrenic impulse rate and
integrated electrical activity
A71-38983
- NETWORK SYNTHESIS**
- Development of analog model of neuron adaptation
and simulation of spontaneous activity of neuron
network
[JPRS-53597] N71-32032
- Cybernetics research involving neuron network
simulation and synthesis of optimal scanning
systems
N71-32033
- NEURAL NETS**
- Integral operating mode of nerve paths
representation by linear diffusion channel with
electrochemically active synapses, deriving
complementary partial differential equations
A71-37250
- Signal propagation in model neuron network in
terms of differential equations system,
representing retina major cell types in planar
model
A71-38276
- Synaptic junction model for memory in brain
[NASA-TN-D-6456] N71-32474
- NEUROGLIA**
- Protein content in cytoplasm of neurons and glial
satellite cells in supraoptical and red nuclei
of white rat brains during natural and
paradoxical phase deprived sleep
A71-38545
- NEURONS**
- Activity correlation of adjacent neurons of cat
cerebral cortex somatosensory zone, considering
distribution of same direction /cophase/ and
different direction /counterphase/ of background
rhythms
A71-37392
- Signals convergence of various sensory modalities
as function of impulse reactions of individual
brain neurons in mammals
A71-38197
- Protein content in cytoplasm of neurons and glial
satellite cells in supraoptical and red nuclei
of white rat brains during natural and
paradoxical phase deprived sleep
A71-38545
- Development of analog model of neuron adaptation
and simulation of spontaneous activity of neuron
network
[JPRS-53597] N71-32032
- Cybernetics research involving neuron network
simulation and synthesis of optimal scanning
systems
N71-32033
- NITROGEN**
- Pulmonary nitrogen washout and carbon monoxide
uptake, developing dynamic mathematical models
for volume and distensibility distributions in
airways and alveoli
A71-39441
- NOISE (SOUND)**
- Psychometric analysis of annoyance by wideband
noise with superimposed narrow band component,
using multiple regression and scaling method
A71-38061
- Noise exposure effects on human physiological and
psychological functions and performance
A71-38959
- Book on noise effects on man covering audiometry,
aural reflex, hearing damage risk, physiological
responses, motor performance and speech

- communication A71-39874
Physiological effects of noise sensitivity [EQ-71-4] N71-32572
Bibliography of literature on environmental pollution, noise pollution, and ear protection devices [AD-724650] N71-33088
- NOISE INJURIES**
Aircraft noise effect on hearing impairment of cockpit crews in civil aviation, using audiometric evaluation A71-38222
- NOISE TOLERANCE**
Noisy environment effects on circulatory, respiratory and metabolic parameters during physical exercise, measuring heart rate, systolic blood pressure, oxygen intake and respiratory quotient A71-38889
Cortical responses of awake cat to narrow-band FM noise stimuli, proposing neuronal model A71-39767
- NONDESTRUCTIVE TESTS**
Measurement of changes in musculoskeletal system under hypodynamic and hypogravic conditions N71-33257
Nondestructive measurement of density, breaking strength, and modulus of elasticity of bones N71-33261
- NORADRENALINE**
Noradrenaline concentration in myocardium of rats subjected to high altitude hypoxia, considering heart regulation in presence of hyperfunction and hypertrophy A71-37393
- NOREPINEPHRINE**
Canine ventricular myocardium as cardiac beta-adrenergic receptor, describing binding of norepinephrine to microsomal particles A71-37900
Circadian rhythm maturation of brain norepinephrine and serotonin in rat, relating spontaneous motor activity and sleep-wakefulness mechanism A71-38071
Renin, plasma norepinephrine and epinephrine responses to work loads of various intensities, evaluating sympathetic nervous system as stimulus for secretion A71-38551
Forearm vascular responses to brachial artery infusions of tyramine and norepinephrine after two weeks bed rest N71-33264
- NOSE (ANATOMY)**
Hypokinesia effects on nasal blood circulation of man N71-33464
- NUCLEIC ACIDS**
Molecular nature of circadian oscillations mechanism, suggesting nucleic acids implication A71-39476
- NUMERICAL ANALYSIS**
Numerical analysis and mathematical models to describe vision process N71-32013
Analysis of registering structure as memory model and role in perception processes N71-32014
- NUTRIENTS**
Mineral composition optimization of nutrient medium for Hydrogenomonas, using steepest ascent method for mathematical planning of experiments A71-39236
Optimal mineral composition in nutrient for autotrophic Hydrogenomonas cultivation N71-33471
- NYSTAGMUS**
Stroke number and vestibular nystagmus duration and frequency under successively increasing angular acceleration from tests on guinea pigs A71-39238
Disoriented visual tracking performance of humans during angular acceleration as result of alcohol consumption [FAA-AH-71-20] N71-32433
Angular acceleration effects on guinea pig vestibular nystagmus
- OCULOMOTOR NERVES**
Firing frequency of single trochlear nerve fibers during eye movements in alert monkey A71-37413
- OPERATIONAL PROBLEMS**
Visual operational problems and sound absorption in porous walls of hydraulic test tunnels [IZP-1971-12] N71-33725
- OPERATOR PERFORMANCE**
Human operator models parameter estimation by stochastic approximation, considering continuous and sampled data models A71-37648
Test equipment for evaluating human higher nervous activity, noting use for radiotelegraphist selection A71-37775
Spacecraft manual control investigation, using human operator models described by linear transfer function with variable coefficients A71-39226
- OPTICAL MEASURING INSTRUMENTS**
Determination of alpha-tocopherol in freeze dried foods by modified colorimetric procedure [AD-713829] N71-31610
- OPTIMIZATION**
Human factors engineering in optimizing visual perception of sonar and radar displays [AD-723992] N71-33187
- ORBITAL SPACE STATIONS**
Space station biological/medical laboratories, discussing physiology, pathology, hematological, static and dynamic equilibrium, neuropsychic, dietetic, radiobiological, hygiene and prophylaxis departments A71-37308
- ORGANIC MATERIALS**
Automatic analysis system for separating and identifying amino acids to detect extraterrestrial life [NASA-TT-F-13765] N71-32232
- ORGANIC PHOSPHORUS COMPOUNDS**
Phosphoenolpyruvate as enzyme inhibitor of phosphoribulokinase in Pseudomonas facilis with respect to ribulose-5-phosphate and ATP A71-38820
Chronic hypercapnia effects on oxygen affinity and 2,3-diphosphoglycerate in red cell from tests on guinea pigs A71-39440
- ORTHOSTATIC TOLERANCE**
Plasma renin activity in hypertonic and normotonic persons exposed to exogenous stress, comparing with measurements at rest and in orthostasis A71-38893
Motor and vestibular analysors and frontal hypothalamus role in gravitational loads compensation during orthostasis, noting respiration, arterial pressure and brain bioelectric activity changes A71-39223
Compensatory capabilities of vestibules, hypothalamus, and central nervous system toward gravitational effects on cats during orthostasis N71-33458
- OSCILLATIONS**
Approach indicator oscillation and illuminating effects on human performance of compensatory tracking tasks [NASA-CR-119640] N71-31618
- OSMOSIS**
Potassium concentrations and osmolality levels changes effects on vascular resistance in subcutaneous adipose tissue blood flow A71-39379
- OTOLITH ORGANS**
Evidence for test of dynamic otolith function considered in relation to responses from patient with idiopathic progressive vestibular degeneration [AD-722318] N71-31768
- OUTER PLANETS EXPLORERS**
Planetary quarantine constraint effect on multiple outer planet missions, considering navigation error sources and midcourse maneuvers

[AAS PAPER 71-122] A71-37917
OXYGEN
 HeO2 saturation dives to verify no-decompression repetitive excursion format of Deep Submergence Systems project
 [AD-723172] N71-32602
 Repetitive excursion dives from saturated depths using helium-oxygen mixtures to eliminate decompression sickness
 [AD-723173] N71-32632
 Revised tables for conversion of water depth and partial pressure combinations into appropriate oxygen percentages for diver decompression
 [AD-724282] N71-33125
OXYGEN CONSUMPTION
 Maximum oxygen uptake measurement by two techniques, calculating heart rate
 A71-38553
 Heart maximal aerobic and anaerobic power and stroke volume, discussing cardiac output and blood oxygen capacity measurements in subalpine population subjects
 A71-38887
 World champion marathon runner metabolic responses during submaximal and maximal treadmill running, recording oxygen consumption, heart rate and lactic acid
 A71-38890
 Postexercise elevated tissue temperatures contributions to oxygen consumption in rats, suggesting hypothalamic adjustment
 A71-38981
OXYGEN METABOLISM
 Regional cerebral blood flow, tissue oxygen, EEG activity and behavioral reaction at high pressure
 A71-38557
 Oxygen uptake kinetics by hemoglobin layers, using Hill advancing front equation
 A71-38567
 Daily endurance exercise influence on key tissues resting aerobic metabolism, using Warburg technique to determine rats heart, skeletal muscle and liver tissue oxygen consumption
 A71-38886
 Bed rest effects on human hemodynamic and gaseous metabolism, observing increased cardiac output and decreased oxygen consumption and carbon dioxide production
 A71-39231
 Bed rest and immobilization effects on oxygen transport system of human body
 N71-33262
OXYGEN TENSION
 Alveolar-arterial oxygen pressure difference during controlled hyperventilation and posthyperventilatory phase
 A71-38200
 Diffusion component of alveolar-arterial oxygen pressure differences in man at rest and during exercise
 A71-38556
 Chronic hypercapnia effects on oxygen affinity and 2,3-diphosphoglycerate in red cell from tests on guinea pigs
 A71-39440
 Inspired oxygen concentrations effects on arterial and mixed venous pH, carbon dioxide uptake and oxygen partial pressure in normal subjects
 A71-39442
OZONE
 Rabbit tolerance to pulmonary edema by lung exposure to low ozone dosage
 A71-38558
 Low ozone dosage exposure effects on rabbit lung endogenous defense mechanisms
 A71-38559

P

PARKINSON DISEASE
 Stop test method to study acceleration in movement control processes in man, considering elbow joint movements in normal and pathological tremors in Parkinson disease afflicted subjects
 A71-37569
PARTIAL DIFFERENTIAL EQUATIONS
 Integral operating mode of nerve paths representation by linear diffusion channel with

electrochemically active synapses, deriving complementary partial differential equations
 A71-37250
PARTIAL PRESSURE
 Revised tables for conversion of water depth and partial pressure combinations into appropriate oxygen percentages for diver decompression
 [AD-724282] N71-33125
PATHOLOGICAL EFFECTS
 Stop test method to study acceleration in movement control processes in man, considering elbow joint movements in normal and pathological tremors in Parkinson disease afflicted subjects
 A71-37569
PATTERN RECOGNITION
 Problems of automatic auditory pattern recognition and solutions
 N71-32010
 Analog to digital converters for description and recognition of voice signals
 N71-32011
PERFORMANCE
 Performance of protective clothing in large J4-4 fuel fires
 [AD-724648] N71-32925
PERFORMANCE PREDICTION
 Pilot training performance data correlation in performance and probability estimation of training completion for advanced training personnel selection
 [AD-718848] N71-31621
 Prediction of human reaction time to light flashes
 [AD-724001] N71-33087
PERFORMANCE TESTS
 Polyvinyl chloride membrane vapor diffusion urine water reclamation system design and performance tests for flight systems
 [NASA-CR-111932] N71-33400
PERSONALITY TESTS
 Three phase code transformation task reliability and correlation, representing general/factor analytic intellectual abilities and personality characteristics
 A71-39073
PERSONNEL DEVELOPMENT
 Psychological training for personality development of aircraft stewardesses for conscious passenger relation establishment
 A71-38224
PERSONNEL MANAGEMENT
 Multiple correlation of university and flight training biographical information as management tool in personnel selection for pilot training
 [AD-717941] N71-31620
PERSONNEL SELECTION
 Test equipment for evaluating human higher nervous activity, noting use for radiotelegraphist selection
 A71-37775
 Multiple correlation of university and flight training biographical information as management tool in personnel selection for pilot training
 [AD-717941] N71-31620
 Pilot training performance data correlation in performance and probability estimation of training completion for advanced training personnel selection
 [AD-718848] N71-31621
 Problem solving task for mental ability assessment in selection of aviation personnel
 [FAA-AM-71-28] N71-32434
 Development of multivariate system for evaluating potential effectiveness of military aviation personnel during training
 [AD-724696] N71-33148
 Development of procedure for predicting success of personnel in military aviation training
 [AD-724695] N71-33149
PH
 Inspired oxygen concentrations effects on arterial and mixed venous pH, carbon dioxide uptake and oxygen partial pressure in normal subjects
 A71-39442
PHARMACOLOGY
 Isoproterenol, atrial pacing, ouabain and methoxamine effects on dogs during experimental cardiac tamponade, observing arterial pressure, cardiac output and heart rate changes
 A71-38968

PHENYLALANINE

Brain polysomes disaggregation and tryptophan elevation in immature rats and adult animals after L-dopa administration
A71-38979

PHONOCARDIOGRAPHY

Phonocardiograph design and calibration for accurate measuring and recording of cardiac vibration displacements, velocities and accelerations
A71-37231

First heart sound changes, discussing sound vibration and transmission and cardiac function
A71-37232

Second heart sound changes due to position and magnitude variations of aortic or pulmonary component
A71-37233

Frequency phonocardiography technique for heart sounds and murmurs registration, producing analog voltage proportional to frequency by zero crossing detector
A71-37234

Diastolic heart sounds and filling waves in coronary artery disease, relating graphic abnormalities and clinical, arteriographic and hemodynamic findings
A71-37550

Frequency distribution of heart sounds in precordium, studying slope of attenuation and relative peaking
A71-38803

PHOSPHENE

Threshold electrical phosphene dependence on impulse duration and stimulation frequency in subjects adapted to darkness
A71-37444

PHOTOCHEMICAL REACTIONS

Mechanisms of inactivation and repair in determination of effects of ultraviolet radiation on algae
[COO-1793-J]
N71-33577

PHOTOSYNTHESIS

Discussion of photosynthesis process and production of cenoses
N71-33510

PHYSICAL EXERCISE

Exercise-induced human protein catabolism not due to caloric deficit
A71-38552

High muscle glycogen content effect on human performance in prolonged heavy physical exercise
A71-38554

Noisy environment effects on circulatory, respiratory and metabolic parameters during physical exercise, measuring heart rate, systolic blood pressure, oxygen intake and respiratory quotient
A71-38889

Heart rate variation during and after muscular exercise, discussing correlated measurements of rectal and mean skin temperatures, blood lactate, pyruvate and glucose
A71-38891

Polycythemia and altitude hypoxia effects on rats heart and sea level exercise tolerance
A71-38980

Amino acid levels in fasted and fed rats plasma, liver, muscle and kidney during and after exercise, noting glutamine decrease in liver tissue
A71-38982

Physicotechnical and biomedical aspects of human efficiency under weightlessness, discussing physical exercise role in adaptation
A71-39217

PHYSICAL FACTORS

Mechanical responses of human head subjected to acceleration loads determined for use in construction of artificial head
N71-32547

PHYSICAL WORK

Renin, plasma norepinephrine and epinephrine responses to work loads of various intensities, evaluating sympathetic nervous system as stimulus for secretion
A71-38551

Physical training, cold adaptation, and adaptogen pharmaceutica for increased physiological stress

resistance in rats
N71-33454

PHYSIOLOGICAL DEFENSES

Tissular and cellular biological resistance as indices for organism resistance to adverse effects, noting increase due to muscular training and cold adaptation
A71-39219

PHYSIOLOGICAL EFFECTS

Book on biological effects of radiation covering ionizing radiation properties and effects at molecular, cellular and tissue levels
A71-38048

Exercise-induced human protein catabolism not due to caloric deficit
A71-38552

Low ozone dosage exposure effects on rabbit lung endogenous defense mechanisms
A71-38559

Urinary protein excretion rates in high altitude inhabitants, showing polycythemia effect on creatinine clearances levels
A71-38561

High altitude exposure effects on concentration and total quantity of electrolytes in human serum and extracellular space
A71-38562

Physiological effects of noise sensitivity [EQ-71-4]
N71-32572

Physiological changes in cardiovascular and musculoskeletal systems during manned space flight
N71-33252

Forearm vascular responses to brachial artery infusions of tyramine and norepinephrine after two weeks bed rest
N71-33264

Physiological effects of water immersion and effectiveness of space flight deconditioning countermeasures
N71-33272

Effects of posture on body fluid circulation and long term immersion effects on physiological mechanisms
N71-33273

PHYSIOLOGICAL FACTORS

Heat removal from space suit, discussing anatomic and physiological features suitable for cooling
A71-39224

PHYSIOLOGICAL RESPONSES

Functional relation of primary responses and unit spike activity at subcortical visual centers in cats
A71-37443

Positive and negative deflections in human electroretinogram off response to stimuli
A71-38058

Visually evoked cerebral cortex responses to on- and off-set of patterned light and contour density and sharpness in humans
A71-38282

Renin, plasma norepinephrine and epinephrine responses to work loads of various intensities, evaluating sympathetic nervous system as stimulus for secretion
A71-38551

Physiological responses of burro Equus asinus to oxygen lack in mountain altitudes, studying red blood cell and plasma volumes
A71-38560

Surround luminance effect on relative perceptual latency of response, using test stimuli confined to rod free area of fovea
A71-38774

Cholesterol and esterified cholesterol distribution in human skin from analysis on fat, epidermis, corium, subcutaneous tissue and serum by chromatographic/colorimetric methods
A71-38892

Plasma renin activity in hypertonic and normotonic persons exposed to exogenous stress, comparing with measurements at rest and in orthostasis
A71-38893

Noise exposure effects on human physiological and psychological functions and performance
A71-38959

Brain polysomes disaggregation and tryptophan elevation in immature rats and adult animals after L-dopa administration

SUBJECT INDEX

PRESSURE REDUCTION

- Mammalian cells cultivation at suboptimal temperatures, considering reproduction and cytophysiological changes A71-38979
- Astronaut chromosome aberrations, presenting peripheral blood leukocytes cytogenetic tests for pre and post space flight A71-39220
- Human retinal blood circulation changes and vision disturbance under transversely directed acceleration, using dark chamber teleophthalmoscopy A71-39227
- Nasal vascular system reactions during 120-day bed rest hypokinesia under drug affected metabolism A71-39228
- Stagnant asphyxia in cat carotid body during abrupt blood pressure drop by simultaneous carotid artery clamping and tap opening A71-39229
- Instrumental learning of cardiovascular and visceral responses and behavioral, physiological and biochemical consequences in relation to psychosomatic therapy A71-39443
- Cortical responses of awake cat to narrow-band FM noise stimuli, proposing neuronal model A71-39548
- Intracochlear electric potential of anesthetized cats recorded with potassium filled glass micropipets, determining magnitude and phase of responses A71-39767
- Book on noise effects on man covering audiometry, aural reflex, hearing damage risk, physiological responses, motor performance and speech communication A71-39768
- Physiological response of subjects exposed to cold water environment wearing different protective suit assemblies [AD-724617] A71-39874
- PILOT PERFORMANCE** N71-32907
- Literature survey of nervous-emotional stress effects on pilot during flight, discussing premature fatigue, cardiovascular disorders, psychic disturbances and circadian rhythms A71-37763
- Aircraft recognition accuracy and decision speed comparing single observers and four-man crews [AD-714213] N71-31625
- Pilot injuries on high speed low altitude flight noting acceleration due to gust effects N71-31888
- Physiological responses of inexperienced private pilots to cross-country flying [FAA-AM-71-23] N71-32082
- Mathematical model and information display system for flight control and monitoring aircraft and pilot performance [AD-723051] N71-32566
- Low frequency vibration effects on visual acuity of pilot performing visual task [ISVR-TR-49] N71-32864
- PILOT TRAINING**
- Multiple correlation of university and flight training biographical information as management tool in personnel selection for pilot training [AD-717941] N71-31620
- PLANETARY QUARANTINE**
- Planetary quarantine constraint effect on multiple outer planet missions, considering navigation error sources and midcourse maneuvers [AAS PAPER 71-122] A71-37917
- Application of environmental microbiology to spacecraft quarantine procedures [NASA-CR-119638] N71-31601
- Planetary quarantine, decontamination, microbial release probabilities, and contamination logs for Venus and Mars [NASA-CR-121423] N71-33221
- PLANETARY SURFACES**
- Abundance, persistence, and localization of enzyme activity in terrestrial soil and exploration of soils suitable for planetary life [NASA-CR-121446] N71-33232
- Spore release from solid materials by aeolian erosion on planetary surface
- [NASA-CR-121422] N71-33380
- PLANTS (BOTANY)**
- Biological experiments on plants, animals and bacteria aboard Zond 5, 6 and 7 space probes A71-39134
- Circumlunar space flight effects on spiderwort, dry seeds and onion bulbs germinating capacity, growth stimulation and chromosome rearrangements A71-39605
- PLEURAE**
- Dogs intrapleural and intraesophageal pressures dependence on head positions A71-38564
- POLAR REGIONS**
- Circadian rhythms of human renal excretions in polar, temperate and equatorial regions A71-39477
- POLYCYTHEMIA**
- Urinary protein excretion rates in high altitude inhabitants, showing polycythemia effect on creatinine clearances levels A71-38561
- Polycythemia and altitude hypoxia effects on rats heart and sea level exercise tolerance A71-38980
- POROUS WALLS**
- Visual operational problems and sound absorption in porous walls of hydraulic test tunnels [IZF-1971-12] N71-33725
- POSITION ERRORS**
- Visual target pursuit tracking test confirming error amending by central mechanism without sensory feedback A71-37545
- POSITIONING**
- Dogs intrapleural and intraesophageal pressures dependence on head positions A71-38564
- POSTURE**
- Effects of posture on body fluid circulation and long term immersion effects on physiological mechanisms N71-33273
- POTASSIUM**
- Potassium concentrations and osmolality levels changes effects on vascular resistance in subcutaneous adipose tissue blood flow A71-39379
- PRESSURE BREATHING**
- Repetitive excursion dives from saturated depths using helium-oxygen mixtures to eliminate decompression sickness [AD-723173] N71-32632
- PRESSURE DISTRIBUTION**
- Alveolar-arterial oxygen pressure difference during controlled hyperventilation and posthyperventilatory phase A71-38200
- Intraocular pressure distribution of healthy mental workers in 25-40 years age range, noting symmetry A71-39234
- PRESSURE EFFECTS**
- Regional cerebral blood flow, tissue oxygen, EEG activity and behavioral reaction at high pressure A71-38557
- Active vasodilation in gracilis muscle vascular bed due to perfusion pressure changes A71-39378
- PRESSURE GRADIENTS**
- Dogs intrapleural and intraesophageal pressures dependence on head positions A71-38564
- Deconditioning and its prevention by simulating hydrostatic gradient by use of cardiovascular conditioning suit N71-33274
- PRESSURE MEASUREMENTS**
- Autoclave chronic catheter system and restraining box for blood sampling and pressure measurement for hibernating marmots A71-38568
- Intraocular pressure distribution measurements on healthy subjects engaged in mental work N71-33469
- PRESSURE REDUCTION**
- Revised tables for conversion of water depth and partial pressure combinations into appropriate

PRESSURE SUITS

- oxygen percentages for diver decompression
[AD-724282] N71-33125
- PRESSURE SUITS**
Deconditioning and its prevention by simulating
hydrostatic gradient by use of cardiovascular
conditioning suit N71-33274

PROBABILITY THEORY

- Pilot training performance data correlation in
performance and probability estimation of
training completion for advanced training
personnel selection N71-31621
[AD-718848]
- Planetary quarantine, decontamination, microbial
release probabilities, and contamination logs
for Venus and Mars N71-33221
[NASA-CR-121423]

PROBLEM SOLVING

- Problem solving task for mental ability assessment
in selection of aviation personnel N71-32434
[FAA-AH-71-28]

PRODUCT DEVELOPMENT

- Phonocardiograph design and calibration for
accurate measuring and recording of cardiac
vibration displacements, velocities and
accelerations A71-37231

PRODUCTION ENGINEERING

- Design and fabrication of viton gloves for use in
sterile nitrogen atmospheric processing cabinet
of Lunar Receiving Laboratory N71-31608
[NASA-CR-115112]

PROTECTIVE CLOTHING

- Cold climate clothed human windchill tables,
considering various heat transfer modes and skin
temperature A71-39205
- Physiological response of subjects exposed to cold
water environment wearing different protective
suit assemblies N71-32907
[AD-724617]
- Performance of protective clothing in large J4-4
fuel fires N71-32925
[AD-724648]

PROTEIN METABOLISM

- Chlorella extracellular metabolites, identifying
indole nature biologically active substances A71-38544
- Protein content in cytoplasm of neurons and glial
satellite cells in supraoptical and red nuclei
of white rat brains during natural and
paradoxical phase deprived sleep A71-38545
- Exercise-induced human protein catabolism not due
to caloric deficit A71-38552
- Urinary protein excretion rates in high altitude
inhabitants, showing polycythemia effect on
creatinine clearances levels A71-38561
- Cerebral gamma-aminobutyric acid metabolism and
hyperbaric oxygen induced seizures in chicks
during brain development, noting increased
membrane permeability A71-38970
- Abdominal and head shielding effects on blood
serum protein metabolism of gamma irradiated
dogs N71-33457

PSEUDOMONAS

- Phosphoenolpyruvate as enzyme inhibitor of
phosphoribulokinase in Pseudomonas facilis with
respect to ribulose-5-phosphate and ATP A71-38820

PSYCHOLOGICAL EFFECTS

- Noise exposure effects on human physiological and
psychological functions and performance A71-38959
- Long term exposure to electric shock and
associated stimuli on squirrel monkeys,
considering aggressive and manual responses A71-39070

PSYCHOLOGICAL FACTORS

- Psychological training for personality development
of aircraft stewardesses for conscious passenger
relation establishment A71-38224

PSYCHOLOGICAL TESTS

- Mental work capacity investigation methodology,

SUBJECT INDEX

- including Kekcheev, Kosilov, Zinchenko,
Pratusevich and Kraepelin tests A71-37446
- Test equipment for evaluating human higher nervous
activity, noting use for radiotelegraphist
selection A71-37775
- PSYCHOMETRICS**
Psychometric analysis of annoyance by wideband
noise with superimposed narrow band component,
using multiple regression and scaling method A71-38061
- PSYCHOMOTOR PERFORMANCE**
Human psychomotor performance measurements in
rotating environments, using Langley complex
coordinator and decision response time devices
[ATAA PAPER 71-887] A71-37275
- Human EEG changes and motor analyzer activity
during mental visualization of motions A71-37445
- Conditioned motor reactions characterizing higher
nervous activity, using logokinetic method A71-37447
- Disoriented visual tracking performance of humans
during angular acceleration as result of alcohol
consumption N71-32433
[FAA-AH-71-20]
- PSYCHOPHYSICS**
Ergonomic evaluation of flight crew working
conditions from viewpoint of static and dynamic
adaptation of aircraft system design to human
psychophysical capabilities A71-38016
- Statistical analysis of psychophysics of sensory
perception and signal detection N71-33722
[IZF-1971-13]
- PSYCHOPHYSIOLOGY**
Color and music distraction for operator in
isolated environment and counteract
psychophysiological activity impairment A71-39225
- Color and music effects on humans during prolonged
isolation in confined space N71-33460
- Psychophysical evidence of lateral inhibition in
hearing N71-33859
[IZF-1971-8]
- PSYCHOSOMATICS**
Instrumental learning of cardiovascular and
visceral responses and behavioral, physiological
and biochemical consequences in relation to
psychosomatic therapy A71-39548
- PULMONARY CIRCULATION**
Automatic regulation of volumetric blood flow rate
during artificial blood circulation, using
electromechanical system for controlling
arterial pump of cardiopulmonary machine A71-38641
- Right and left heart and pulmonary blood volume
determination, using radiocardiograms and analog
computer analysis A71-38801
- Analog computer analysis of radiocardiograms,
determining cardiac function and pulmonary blood
volume A71-38802
- Pulmonary nitrogen washout and carbon monoxide
uptake, developing dynamic mathematical models
for volume and distensibility distributions in
airways and alveoli A71-39441
- PULMONARY FUNCTIONS**
Pulmonary diastolic pressure relation to left
ventricle and atrium of patient with diagnostic
heart catheterization at rest A71-38296
- Rabbit tolerance to pulmonary edema by lung
exposure to low ozone dosage A71-38558
- Low ozone dosage exposure effects on rabbit lung
endogenous defense mechanisms A71-38559
- Respiratory reflex mechanism of deep breath
occurrence after period of airway occlusion in
rabbits related to stimulation of vagal
receptors A71-39040

- Inspired oxygen concentrations effects on arterial and mixed venous pH, carbon dioxide uptake and oxygen partial pressure in normal subjects
A71-39442
- PULSE AMPLITUDE**
Electrocardiograph electrode placements for best R-wave amplitude correlation with respiratory volume
[AD-713833] N71-31614
Electrocardiographic monitoring device with arrhythmia signal detector and steplike output of R-wave amplitudes
[AD-712668] N71-31622
- PURSUIT TRACKING**
Visual target pursuit tracking test confirming error amending by central mechanism without sensory feedback
A71-37545
- PYRUVATES**
Heart rate variation during and after muscular exercise, discussing correlated measurements of rectal and mean skin temperatures, blood lactate, pyruvate and glucose
A71-38891

R

- RADARSCOPES**
Human factors engineering in optimizing visual perception of sonar and radar displays
[AD-723992] N71-33187
- RADIATION DAMAGE**
Retinal damage thresholds of rhesus monkeys to ocular radiation from yellow line 568.2 nm emitted by krypton CW gas laser
A71-38284
Abdominal and head shielding effects on blood serum protein metabolism of gamma irradiated dogs
N71-33457
- RADIATION DETECTORS**
Research on avalanche type semiconductor radiation detectors using video amplifiers
[NYO-3246-TA-8] N71-33775
- RADIATION DOSAGE**
Double standard for national levels of exposure and biological hazards of microwave radiation, comparing Soviet work to U.S.
A71-38442
- RADIATION EFFECTS**
Apollo astronauts light flashes observation during lunar flight, discussing interpretation as scintillations in eye lens by multiply charged cosmic rays focusing on retina
A71-37299
Book on biological effects of radiation covering ionizing radiation properties and effects at molecular, cellular and tissue levels
A71-38048
Combined action of vibration and gamma irradiation on sporulation dynamics, survival rate and mutability of *Chlorella*
A71-39237
Medical, zoological and biological effects of ELF signals in atmosphere, comparing with EEG alpha and gamma rhythm
A71-39478
Bibliography on effects of gamma rays, fission fragments, and neutrons on organisms, food, tissues, and nervous system
[AD-724600] N71-33276
Combined vibration and gamma irradiation effects on *Chlorella* culture yield
N71-33472
Radiation effects on cytoplasmic structure and differential activity of genes
[NYO-2356-43] N71-33934
- RADIATION HAZARDS**
Double standard for national levels of exposure and biological hazards of microwave radiation, comparing Soviet work to U.S.
A71-38442
Environmental radiation exposure in air travel, comparing integral radiation dosages for conventional jet transport aircraft and SST
A71-38976
- RADIATION INJURIES**
Injuries and sickness caused by radiation and radioactive decay - bibliographies

- [AD-722970] N71-32239
- RADIATION SHIELDING**
Comparative abdomen and head shield effect during gamma irradiation of dogs on protein fractions in blood serum, noting increased globulins and glutamate aspartate transferases
A71-39222
Abdominal and head shielding effects on blood serum protein metabolism of gamma irradiated dogs
N71-33457
- RADIOACTIVE DECAY**
Injuries and sickness caused by radiation and radioactive decay - bibliographies
[AD-722970] N71-32239
- RADIOACTIVE ISOTOPES**
Lung scanning, describing moving detectors, electronic apparatus adjustment and choice of radionuclide and labelled compound
A71-39072
Radioactive dilution estimation of total skeletal mass in human body
N71-33259
- RADIOISOTOPE BATTERIES**
Radioisotope thermoelectric generators in micro/milliwatt power range for biomedical applications
A71-38912
- RATS**
Prolonged hypokinesia effect on rats serotonin /5-HT/ metabolism, noting pronounced blood content deviation from normal during first to third and thirteenth to fifteenth day
A71-39218
Myocardium reactions under 2G acceleration from histological, histochemical and electron microscopic observations on rats, noting dystrophic damage level relationship to duration
A71-39235
Long term hypokinesia effects on rat serotonin metabolism
N71-33453
Physical training, cold adaptation, and adaptogen pharmaceuticals for increased physiological stress resistance in rats
N71-33454
Radial acceleration effects on spinal cord induced potentials of intact and labyrinthectomized rats
N71-33456
Dystrophic myocardial damage in rat hearts caused by prolonged acceleration
N71-33470
- REACTION KINETICS**
Oxygen uptake kinetics by hemoglobin layers, using Hill advancing front equation
A71-38567
- REACTION TIME**
Human response to auditory stimuli start and cessation, noting time lag and perception duration
A71-37283
Surround luminance effect on relative perceptual latency of response, using test stimuli confined to rod free area of fovea
A71-38774
Prediction of human reaction time to light flashes
[AD-724001] N71-33087
- RECEPTORS (PHYSIOLOGY)**
Canine ventricular myocardium as cardiac beta-adrenergic receptor, describing binding of norepinephrine to microsomal particles
A71-37900
Primary biological receptor element analogous electronic model for potential and afferent pulse train responses to stimuli
A71-38894
- RECORDING INSTRUMENTS**
Phonocardiograph design and calibration for accurate measuring and recording of cardiac vibration displacements, velocities and accelerations
A71-37231
- REFLEXES**
H reflex changes in spinal marrow of intact and labyrinthectomized rats under radial accelerations
A71-39221
- RELIABILITY ANALYSIS**
Three phase code transformation task reliability

- and correlation, representing general/factor analytic intellectual abilities and personality characteristics A71-39073
- RENAL FUNCTION**
- Circadian rhythms of human renal excretions in polar, temperate and equatorial regions A71-39477
- Renal sodium and calcium excretion effects on human electrolytic water-mineral metabolism during space flight N71-33467
- RESEARCH AND DEVELOPMENT**
- Research and development, weightlessness simulation, calcium metabolism, manned space flight, pressure suits, immobilization, and aerospace medicine N71-33275
- RESEARCH FACILITIES**
- Cross-referenced directory of reports of Human Engineering Laboratories 1953 to 1970 N71-31617
- RESPIRATORY PHYSIOLOGY**
- Human respiratory muscles electrical activity, discussing correlation analysis of interferential electromyograms from external intercostal muscles during breathing exercises A71-38198
- Maximum oxygen uptake measurement by two techniques, calculating heart rate A71-38553
- Variable tidal volume effects on lung test gas washout parameters A71-38565
- Respiratory chemoreceptors and acid-base alterations effects on adrenocortical activation during hypoxia in dogs A71-38986
- RESPIRATORY RATE**
- Electrocardiograph electrode placements for best R-wave amplitude correlation with respiratory volume [AD-713833] N71-31614
- RESPIRATORY REFLEXES**
- Respiratory reflex mechanism of deep breath occurrence after period of airway occlusion in rabbits related to stimulation of vagal receptors A71-39040
- RESPIRATORY SYSTEM**
- Noisy environment effects on circulatory, respiratory and metabolic parameters during physical exercise, measuring heart rate, systolic blood pressure, oxygen intake and respiratory quotient A71-38889
- RETINA**
- Signal propagation in model neuron network in terms of differential equations system, representing retina major cell types in planar model A71-38276
- Retinal damage thresholds of rhesus monkeys to ocular radiation from yellow line 568.2 nm emitted by krypton CW gas laser A71-38284
- Human retinal blood circulation changes and vision disturbance under transversely directed acceleration, using dark chamber teleophthalmoscopy A71-39228
- Transverse acceleration effects on blood flow in human retina N71-33463
- RETINAL ADAPTATION**
- Retinal adaptation to prism-displaced hand image in terms of sensorimotor coordination central control change A71-37543
- Proposed prism adaptation model suggesting visual motor control loop as linear system comprising independent subsystems A71-37544
- Detectability measurement of foveal stimulus, suggesting nonuniformity of retinal illuminance in visual task A71-38278
- RETINAL IMAGES**
- Apollo astronauts light flashes observation during lunar flight, discussing interpretation as scintillations in eye lens by multiply charged cosmic rays focusing on retina A71-37299
- Retinal adaptation to prism-displaced hand image in terms of sensorimotor coordination central control change A71-37543
- Stimulus patterns spatial intervals and line thickness effects on stabilized retinal images A71-38280
- Visual evoked potential relationship to apparent size reduction of invariant retinal image A71-38281
- RHYTHM (BIOLOGY)**
- Activity correlation of adjacent neurons of cat cerebral cortex somatosensory zone, considering distribution of same direction /cophase/ and different direction /counterphase/ of background rhythms A71-37392
- Medical, zoological and biological effects of ELF signals in atmosphere, comparing with EEG alpha and gamma rhythm A71-39478
- Summation dial vectorial representation of stationary and nonstationary time series data, relating rhythms in bed rest study A71-39480
- ROCKET FIRING**
- UH-1P helicopter acoustic measurements during gunfire and rocket firing including bioacoustic factors [AD-713830] N71-31613
- ROTATING ENVIRONMENTS**
- Human psychomotor performance measurements in rotating environments, using Langley complex coordinator and decision response time devices [ATAA PAPER 71-887] A71-37275
- RUNNING**
- World champion marathon runner metabolic responses during submaximal and maximal treadmill running, recording oxygen consumption, heart rate and lactic acid A71-38890
- SCANNING**
- Cybernetics research involving neuron network simulation and synthesis of optimal scanning systems N71-32033
- Synthesis of optimal search scanning systems using special filament optical image converters N71-32034
- Holographic scanning for acoustic imaging in liquid sodium [BNWL-1558] N71-33486
- SCINTILLATION**
- Apollo astronauts light flashes observation during lunar flight, discussing interpretation as scintillations in eye lens by multiply charged cosmic rays focusing on retina A71-37299
- Astronomical telescopes image motion, distortion and scintillation, examining atmospheric refractive index and density/temperature variation effects A71-38571
- SEARCHING**
- Synthesis of optimal search scanning systems using special filament optical image converters N71-32034
- SEIZURES**
- Cerebral gamma-aminobutyric acid metabolism and hyperbaric oxygen induced seizures in chicks during brain development, noting increased membrane permeability A71-38970
- SEMICONDUCTOR DEVICES**
- Research on avalanche type semiconductor radiation detectors using video amplifiers [N70-3246-TA-8] N71-33775
- SENSITIVITY**
- Physiological effects of noise sensitivity [EQ-71-4] N71-32572
- SENSORIMOTOR PERFORMANCE**
- Retinal adaptation to prism-displaced hand image

- in terms of sensorimotor coordination central control change A71-37543
- Proposed prism adaptation model suggesting visual motor control loop as linear system comprising independent subsystems A71-37544
- Weightlessness effects on human sensorimotor performance and locomotion N71-33452
- SENSORY FEEDBACK**
- Proposed prism adaptation model suggesting visual motor control loop as linear system comprising independent subsystems A71-37544
- Visual target pursuit tracking test confirming error amending by central mechanism without sensory feedback A71-37545
- SENSORY PERCEPTION**
- Human response to auditory stimuli start and cessation, noting time lag and perception duration A71-37283
- Activity correlation of adjacent neurons of cat cerebral cortex somatosensory zone, considering distribution of same direction /cophase/ and different direction /counterphase/ of background rhythms A71-37392
- Statistical analysis of psychophysics of sensory perception and signal detection [IZP-1971-13] N71-33722
- SENSORY STIMULATION**
- Positive and negative deflections in human electroretinogram off response to stimuli A71-38058
- Signals convergence of various sensory modalities as function of impulse reactions of individual brain neurons in mammals A71-38197
- Hue shifts by intermittent stimulation, suggesting interaction between stimulus intermittency and temporal color coding in visual system A71-38283
- Primary biological receptor element analogous electronic model for potential and afferent pulse train responses to stimuli A71-38894
- Cortical responses of awake cat to narrow-band FM noise stimuli, proposing neuronal model A71-39767
- SERUMS**
- Cholesterol and esterified cholesterol distribution in human skin from analysis on fat, epidermis, corium, subcutaneous tissue and serum by chromatographic/colorimetric methods A71-38892
- SIGNAL ANALYSIS**
- Analog to digital converters for voice signal analysis [JPRS-53606] N71-32009
- SIGNAL DETECTION**
- Statistical analysis of psychophysics of sensory perception and signal detection [IZP-1971-13] N71-33722
- SIGNAL DETECTORS**
- Analog computer program and display device for detecting arrhythmia signals during electrocardiography [AD-711039] N71-31612
- Electrocardiographic monitoring device with arrhythmia signal detector and steplike output of R-wave amplitudes [AD-712668] N71-31622
- SIGNAL TRANSMISSION**
- Signal propagation in model neuron network in terms of differential equations system, representing retina major cell types in planar model A71-38276
- Ear inherent channel capacity estimation by applying Shannon equations for binary signal transmission A71-39769
- SILICON DIOXIDE**
- Amino silica gels absorption properties with respect to carbon dioxide, hydrogen sulfide and water vapor, comparing affinity A71-39233
- Amino silica gel absorbers for atmospheric purification systems of spacecraft cabins N71-33468
- SKIN (ANATOMY)**
- Cholesterol and esterified cholesterol distribution in human skin from analysis on fat, epidermis, corium, subcutaneous tissue and serum by chromatographic/colorimetric methods A71-38892
- SKIN TEMPERATURE (BIOLOGY)**
- Heart rate variation during and after muscular exercise, discussing correlated measurements of rectal and mean skin temperatures, blood lactate, pyruvate and glucose A71-38891
- Cold climate clothed human windchill tables, considering various heat transfer modes and skin temperature A71-39205
- SLEEP DEPRIVATION**
- Protein content in cytoplasm of neurons and glial satellite cells in supraoptical and red nuclei of white rat brains during natural and paradoxical phase deprived sleep A71-38545
- Human reactions to sleep deprivation by simulated sonic booms [ISVR-TR-41] N71-32865
- SOCIAL ISOLATION**
- Color and music distraction for operator in isolated environment and counteract psychophysiological activity impairment A71-39225
- SODIUM**
- Sodium and cations elimination by kidneys during water-salt metabolism changes due to high temperature and hypodynamia A71-39232
- SOIL MECHANICS**
- Abundance, persistence, and localization of enzyme activity in terrestrial soil and exploration of soils suitable for planetary life [NASA-CR-121446] N71-33232
- SOIL SCIENCE**
- Analysis of natural zones and space ecosystems noting relationships of living animals and biosphere N71-33505
- Applications of radioisotopes in experimental biogeocenology to determine fertilizer turnover during growth of crops N71-33506
- Application of microbic cenoses to problems of soil fertility N71-33507
- SONAR**
- Human factors engineering in optimizing visual perception of sonar and radar displays [AD-723992] N71-33187
- SONIC BOOMS**
- Human reactions to sleep deprivation by simulated sonic booms [ISVR-TR-41] N71-32865
- SOUND INTENSITY**
- Frequency distribution of heart sounds in precordium, studying slope of attenuation and relative peaking A71-38803
- SOUND TRANSMISSION**
- First heart sound changes, discussing sound vibration and transmission and cardiac function A71-37232
- Kinematic analysis and simulation of transmission modes of sound energy through middle ear A71-38062
- Ultrasound absorption in liver tissue due to macromolecular relaxation processes A71-39770
- Visual operational problems and sound absorption in porous walls of hydraulic test tunnels [IZP-1971-12] N71-33725
- SOUND WAVES**
- First heart sound changes, discussing sound vibration and transmission and cardiac function A71-37232
- SPACE FLIGHT STRESS**
- Astronaut chromosome aberrations, presenting peripheral blood leukocytes cytogenetic tests

SPACE MISSIONS

- for pre and post space flight
A71-39227
- Circumlunar space flight effects on spiderwort,
dry seeds and onion bulbs germinating capacity,
growth stimulation and chromosome rearrangements
A71-39605
- Medical and biological problems of prolonged
manned space flight
[JPRS-53801] N71-33451
- SPACE MISSIONS**
- Planetary quarantine constraint effect on multiple
outer planet missions, considering navigation
error sources and midcourse maneuvers
[AAS PAPER 71-122] A71-37917
- SPACE PERCEPTION**
- Stereoscopic vision and depth discrimination tests
in cats, using conditioned suppression and rod-
like shadow disparity stimuli
A71-39958
- Color and illuminance effects on visual space
perception
[AD-724623] N71-33138
- SPACE SHUTTLES**
- Space shuttle orbital centrifuge systems
configuration, comparing artificial gravity
experiment performance options
[AIAA PAPER 71-860] A71-37274
- SPACE SUITS**
- Heat removal from space suit, discussing anatomic
and physiological features suitable for cooling
A71-39224
- Anatomical-physiological characteristics of heat
transfer in human body for developing insulating
suit
N71-33459
- SPACECRAFT CABIN ATMOSPHERES**
- Amino silica gel absorbers for atmospheric
purification systems of spacecraft cabins
N71-33468
- SPACECRAFT CONTAMINATION**
- Planetary quarantine, decontamination, microbial
release probabilities, and contamination logs
for Venus and Mars
[NASA-CR-121423] N71-33221
- SPACECRAFT CONTROL**
- Spacecraft manual control investigation, using
human operator models described by linear
transfer function with variable coefficients
A71-39226
- SPACECRAFT DESIGN**
- Determination and application of aeromedical
standards to occupant selection, aircraft design
features, and operational guidelines for
spacecraft design
[FAA-AM-71-33] N71-32083
- SPACECRAFT STERILIZATION**
- Bacterial spore distribution and dry heat
resistance on Mariner-Mars 1969 spacecraft,
using randomly selected aerobic mesophilic
isolates
A71-37646
- Bibliography of scientific publications and
presentations relating to planetary quarantine
for year 1970 - Vol. 5
[NASA-CR-121325] N71-32231
- SPECTROPHOTOMETRY**
- Determination of alpha-tocopherol in freeze dried
foods by modified colorimetric procedure
[AD-713829] N71-31610
- SPEECH**
- Book on noise effects on man covering audiometry,
aural reflex, hearing damage risk, physiological
responses, motor performance and speech
communication
A71-39874
- SPIKE POTENTIALS**
- Functional relation of primary responses and unit
spike activity at subcortical visual centers in
cats
A71-37443
- SPINAL CORD**
- H reflex changes in spinal marrow of intact and
labyrinthectomized rats under radial
accelerations
A71-39221
- Radial acceleration effects on spinal cord induced
potentials of intact and labyrinthectomized rats
N71-33456

SUBJECT INDEX

SPORES

- Bacterial spore distribution and dry heat
resistance on Mariner-Mars 1969 spacecraft,
using randomly selected aerobic mesophilic
isolates
A71-37646
- Combined action of vibration and gamma irradiation
on sporulation dynamics, survival rate and
mutability of chlorella
A71-39237
- Spore release from solid materials by aeolian
erosion on planetary surface
[NASA-CR-121422] N71-33380
- STANDARDS**
- Double standard for national levels of exposure
and biological hazards of microwave radiation,
comparing Soviet work to U.S.
A71-38442
- STATISTICAL ANALYSIS**
- Statistical analysis of psychophysics of sensory
perception and signal detection
[IZP-1971-13] N71-33722
- STATISTICAL CORRELATION**
- Collation of adult anthropometry with source both
domestic and foreign, male and female, military
and civilian - Vol. 2
[AD-723630] N71-32715
- STEEPEST DESCENT METHOD**
- Mineral composition optimization of nutrient
medium for Hydrogenomonas, using steepest ascent
method for mathematical planning of experiments
A71-39236
- STEREOSCOPIC VISION**
- Stereoscopic vision and depth discrimination tests
in cats, using conditioned suppression and rod-
like shadow disparity stimuli
A71-39958
- STOCHASTIC PROCESSES**
- Human operator models parameter estimation by
stochastic approximation, considering continuous
and sampled data models
A71-37648
- Cybernetics including models for statistical
decision making, biomechanical systems, and
complex stochastic system
[JPRS-53531] N71-32088
- STRESS (PHYSIOLOGY)**
- Literature survey of nervous-emotional stress
effects on pilot during flight, discussing
premature fatigue, cardiovascular disorders,
psychic disturbances and circadian rhythms
A71-37763
- Plasma renin activity in hypertonic and normotonic
persons exposed to exogenous stress, comparing
with measurements at rest and in orthostasis
A71-38893
- Physical training, cold adaptation, and adaptogen
pharmaceutica for increased physiological stress
resistance in rats
N71-33454
- Anthropometric methods for determining psychic and
physical stresses caused by vibration effects on
human body
[DLR-MITT-70-11] N71-33970
- STRESS (PSYCHOLOGY)**
- Literature survey of nervous-emotional stress
effects on pilot during flight, discussing
premature fatigue, cardiovascular disorders,
psychic disturbances and circadian rhythms
A71-37763
- Psychometric analysis of annoyance by wideband
noise with superimposed narrow band component,
using multiple regression and scaling method
A71-38061
- Anthropometric methods for determining psychic and
physical stresses caused by vibration effects on
human body
[DLR-MITT-70-11] N71-33970
- STRESS ANALYSIS**
- Human heat stress evaluation indices, discussing
acclimatization, dehydration, clothing, age,
physical fitness, health and sex effects
A71-37483
- SUBMERGING**
- Physiological effects of water immersion and
effectiveness of space flight deconditioning
countermeasures
N71-33272

Effects of posture on body fluid circulation and long term immersion effects on physiological mechanisms
N71-33273

SUGARS
Food utility calculation for various formose sugar treatments as valid qualitative measure of relative effects of dietary materials
A71-37575

SUPERSONIC TRANSPORTS
Environmental radiation exposure in air travel, comparing integral radiation dosages for conventional jet transport aircraft and SST
A71-38976

SURGERY
Cryogenics applications to cryosurgery and long term low temperature storage of living cells and tissues
A71-39252

SURVIVAL
Arctic field tests of prototype life rafts capable of protecting astronauts from cold water exposure for 72 hours
[NASA-CR-121449]
N71-33718

SYMBIOSIS
Role of individual components of biogeocenosis in organization of structure and functions
N71-33509
Effect of solar radiation on energy balance of biogeocenosis
N71-33512

SYMPATHETIC NERVOUS SYSTEM
Renin, plasma norepinephrine and epinephrine responses to work loads of various intensities, evaluating sympathetic nervous system as stimulus for secretion
A71-38551

SYNAPSES
Integral operating mode of nerve paths representation by linear diffusion channel with electrochemically active synapses, deriving complementary partial differential equations
A71-37250

SYSTEMS ENGINEERING
Use of new philosophy of total learning process for improved crew member training
[AD-723313]
N71-31741
Model for quantitatively examining performance of automatic machines with normal and disturbed functions in statistical decision making
N71-32089
Polyvinyl chloride membrane vapor diffusion urine water reclamation system design and performance tests for flight systems
[NASA-CR-111932]
N71-33400

T

TABLES (DATA)
Cold climate clothed human windchill tables, considering various heat transfer modes and skin temperature
A71-39205
Revised tables for conversion of water depth and partial pressure combinations into appropriate oxygen percentages for diver decompression
[AD-724282]
N71-33125

TARGET ACQUISITION
Extraretinal correction and memory for target position, suggesting corrective tendency of eye movements in dark
A71-38286

TARGET RECOGNITION
Aircraft recognition accuracy and decision speed comparing single observers and four-man crews
[AD-714213]
N71-31625

TASKS
Three phase code transformation task reliability and correlation, representing general/factor analytic intellectual abilities and personality characteristics
A71-39073

TEMPERATE REGIONS
Circadian rhythms of human renal excretions in polar, temperate and equatorial regions
A71-39477

TEMPERATURE CONTROL
Dynamic mathematical model of physiological regulation of body temperature in human beings

[NASA-CR-1855]
N71-33401

TEMPERATURE EFFECTS
Thermal behavior simulation of cooling biological system, describing heat generation and transfer at normothermic to hibernating body temperatures with mathematical model
A71-38199

TEMPERATURE INVERSIONS
Atmospheric circulation and aerosol pollution transport noting role of temperature inversions
[IPA-RDP-36]
N71-32863

TEMPERATURE MEASURING INSTRUMENTS
Continuous recording of human rectal temperature under extreme environmental conditions, using battery powered thermographs with thermistor probes
A71-39041

TEST EQUIPMENT
Test equipment for evaluating human higher nervous activity, noting use for radiotelegraphist selection
A71-37775

THERMAL INSULATION
Anatomical-physiological characteristics of heat transfer in human body for developing insulating suit
N71-33459

THERMAL STRESSES
Human heat stress evaluation indices, discussing acclimatization, dehydration, clothing, age, physical fitness, health and sex effects
A71-37483

THERMISTORS
Continuous recording of human rectal temperature under extreme environmental conditions, using battery powered thermographs with thermistor probes
A71-39041

THERMOELECTRIC GENERATORS
Radioisotope thermoelectric generators in micro/milliwatt power range for biomedical applications
A71-38912

THERMOREGULATION
Thermal behavior simulation of cooling biological system, describing heat generation and transfer at normothermic to hibernating body temperatures with mathematical model
A71-38199

THRESHOLDS (PERCEPTION)
Threshold electrical phosphene dependence on impulse duration and stimulation frequency in subjects adapted to darkness
A71-37444
Increment thresholds for foveally viewed square and circular visual stimuli, suggesting availability of more than one spatial integration pattern
A71-38277

TIME LAG
Human response to auditory stimuli start and cessation, noting time lag and perception duration
A71-37283

TIME SERIES ANALYSIS
Summation dial vectorial representation of stationary and nonstationary time series data, relating rhythms in bed rest study
A71-39480

TISSUES (BIOLOGY)
Book on biological effects of radiation covering ionizing radiation properties and effects at molecular, cellular and tissue levels
A71-38048
Daily endurance exercise influence on key tissues resting aerobic metabolism, using Warburg technique to determine rats heart, skeletal muscle and liver tissue oxygen consumption
A71-38886
Cholesterol and esterified cholesterol distribution in human skin from analysis on fat, epidermis, corium, subcutaneous tissue and serum by chromatographic/colorimetric methods
A71-38892
Postexercise elevated tissue temperatures contributions to oxygen consumption in rats, suggesting hypothalamic adjustment
A71-38981

TOCOPHEROL

SUBJECT INDEX

Tissular and cellular biological resistance as indices for organism resistance to adverse effects, noting increase due to muscular training and cold adaptation A71-39219

Cryogenics applications to cryosurgery and long term low temperature storage of living cells and tissues A71-39252

Ultrasound absorption in liver tissue due to macromolecular relaxation processes A71-39770

TOCOPHEROL

Determination of alpha-tocopherol in freeze dried foods by modified colorimetric procedure [AD-713829] N71-31610

TOLERANCES (PHYSIOLOGY)

Rabbit tolerance to pulmonary edema by lung exposure to low ozone dosage A71-38558

TRANSPORT PROPERTIES

Atmospheric circulation and aerosol pollution transport noting role of temperature inversions [IPA-RDP-36] N71-32863

TRANSVERSE ACCELERATION

Transverse acceleration effects on blood flow in human retina N71-33463

TREMORS

Stop test method to study acceleration in movement control processes in man, considering elbow joint movements in normal and pathological tremors in Parkinson disease afflicted subjects A71-37569

TROPICAL REGIONS

Circadian rhythms of human renal excretions in polar, temperate and equatorial regions A71-39477

TRYPTAMINES

Prolonged hypokinesia effect on rats serotonin /5-HT/ metabolism, noting pronounced blood content deviation from normal during first to third and thirteenth to fifteenth day A71-39218

TRYPTOPHAN

Brain polysomes disaggregation and tryptophan elevation in immature rats and adult animals after L-dopa administration A71-38979

U

UH-1 HELICOPTER

UH-1P helicopter acoustic measurements during gunfire and rocket firing including bioacoustic factors [AD-713830] N71-31613

ULTRASONIC RADIATION

Ultrasound absorption in liver tissue due to macromolecular relaxation processes A71-39770

ULTRASONIC TESTS

Monograph on blood flow rates instantaneous measurement from ultrasound signals of Doppler flowmeter, discussing steady laminar flow test results A71-39262

ULTRAVIOLET RADIATION

Mechanisms of inactivation and repair in determination of effects of ultraviolet radiation on algae [COO-1793-J] N71-33577

UNDERWATER TESTS

Physiological response of subjects exposed to cold water environment wearing different protective suit assemblies [AD-724617] N71-32907

UNIVERSITIES

Multiple correlation of university and flight training biographical information as management tool in personnel selection for pilot training [AD-717941] N71-31620

URINALYSIS

Urinary protein excretion rates in high altitude inhabitants, showing polycythemia effect on creatinine clearances levels A71-38561

URINATION

Chronic centrifugation effects on water intake and

urine output in mice, considering food intake and growth rate A71-38984

URINE

Composition, and chemical, physical, and concentrative properties of human urine [NASA-CR-18022] N71-32520

Polyvinyl chloride membrane vapor diffusion urine water reclamation system design and performance tests for flight systems [NASA-CR-111932] N71-33400

V

VASCULAR SYSTEM

Nasal vascular system reactions during 120-day bed rest hypokinesia under drug affected metabolism A71-39229

Active vasodilation in gracilis muscle vascular bed due to perfusion pressure changes A71-39378

Potassium concentrations and osmolality levels changes effects on vascular resistance in subcutaneous adipose tissue blood flow A71-39379

Forearm vascular responses to brachial artery infusions of tyramine and norepinephrine after two weeks bed rest N71-33264

VASODILATION

Active vasodilation in gracilis muscle vascular bed due to perfusion pressure changes A71-39378

VEINS

Small pressure wave transmission in abdominal venae cavae of dogs in mathematical model development for viscoelastic behavior of large veins A71-38987

Inspired oxygen concentrations effects on arterial and mixed venous pH, carbon dioxide uptake and oxygen partial pressure in normal subjects A71-39442

VELOCITY MEASUREMENT

Monograph on blood flow rates instantaneous measurement from ultrasound signals of Doppler flowmeter, discussing steady laminar flow test results A71-39262

VENTILATION

Phrenic nerve activity correlation with ventilation in anesthetized cats, analyzing relationship between phrenic impulse rate and integrated electrical activity A71-38983

VESTIBULAR TESTS

Stroke number and vestibular nystagmus duration and frequency under successively increasing angular acceleration from tests on guinea pigs A71-39238

Angular acceleration effects on guinea pig vestibular nystagmus N71-33473

VESTIBULES

Motor and vestibular analysors and frontal hypothalamus role in gravitational loads compensation during orthostasis, noting respiration, arterial pressure and brain bioelectric activity changes A71-39223

Evidence for test of dynamic otolith function considered in relation to responses from patient with idiopathic progressive vestibular degeneration [AD-722318] N71-31768

Compensatory capabilities of vestibules, hypothalamus, and central nervous system toward gravitational effects on cats during orthostasis N71-33458

VIBRATION EFFECTS

Combined action of vibration and gamma irradiation on sporulation dynamics, survival rate and mutability of chlorella A71-39237

Dynamic reactions of operators with random vibrational stimuli and biomechanical systems N71-32090

Low frequency vibration effects on visual acuity of pilot performing visual task

SUBJECT INDEX

VISUAL STIMULI

- [ISVR-TR-49] N71-32864
Combined vibration and gamma irradiation effects
on Chlorella culture yield
- N71-33472
Anthropometric methods for determining psychic and
physical stresses caused by vibration effects on
human body
[DLR-MITT-70-11] N71-33970
- VIDEO EQUIPMENT**
Research on avalanche type semiconductor radiation
detectors using video amplifiers N71-33775
[NYO-3246-TA-8]
- VISCEBA**
Instrumental learning of cardiovascular and
visceral responses and behavioral, physiological
and biochemical consequences in relation to
psychosomatic therapy A71-39548
- VISCOELASTICITY**
Small pressure wave transmission in abdominal
venae cavae of dogs in mathematical model
development for viscoelastic behavior of large
veins A71-38987
- VISION**
Mathematical models of vision process,
relationship between memory and perception, and
development of improved computer technology
[JPRS-53647] N71-32012
Numerical analysis and mathematical models to
describe vision process N71-32013
- VISUAL ACUITY**
Visual system image blur and lateral inhibition
effects on visual performance, convolving
luminance profiles of targets with point spread
functions A71-38059
Wavelength discrimination from color naming by
young adults with normal visual acuity and color
vision A71-38285
Helicopter pilot visual acuity determined from
flight tests N71-31660
[ISVR-TR-44]
Determination of relationship between several
measures of field independence and performance
on real-life visual detection problem N71-32825
[AD-724115]
Low frequency vibration effects on visual acuity
of pilot performing visual task N71-32864
[ISVR-TR-49]
- VISUAL DISCRIMINATION**
Wavelength discrimination from color naming by
young adults with normal visual acuity and color
vision A71-38285
Stereoscopic vision and depth discrimination tests
in cats, using conditioned suppression and rod-
like shadow disparity stimuli A71-39958
Mathematical models of vision process,
relationship between memory and perception, and
development of improved computer technology
[JPRS-53647] N71-32012
Effect of unidirectional movements of total
optical environment on spatial disorientation
with respect to external visual reference points
[FAA-AM-71-22] N71-32081
Spectral sensitivity and dominance of color center
cones in macaque monkeys based on flicker
electroretinography N71-33823
[IZF-1971-10]
- VISUAL FIELDS**
Determination of relationship between several
measures of field independence and performance
on real-life visual detection problem N71-32825
[AD-724115]
- VISUAL PERCEPTION**
Functional relation of primary responses and unit
spike activity at subcortical visual centers in
cats A71-37443
Visual target pursuit tracking test confirming
error amending by central mechanism without
sensory feedback A71-37545
Visual system image blur and lateral inhibition
effects on visual performance, convolving
- luminance profiles of targets with point spread
functions A71-38059
Increment thresholds for foveally viewed square
and circular visual stimuli, suggesting
availability of more than one spatial
integration pattern A71-38277
Visual sensations produced by cosmic ray muons
passing in different directions through human
eyes and head A71-38677
Human retinal blood circulation changes and vision
disturbance under transversely directed
acceleration, using dark chamber
teleophthalmoscopy A71-39228
Visual attention automatization due to repeated
stimulus experience, noting fixation rate
habituation concomitance with fixations spatial
distribution uncertainty reduction A71-39545
Effect of unidirectional movements of total
optical environment on spatial disorientation
with respect to external visual reference points
[FAA-AM-71-22] N71-32081
Disoriented visual tracking performance of humans
during angular acceleration as result of alcohol
consumption N71-32433
[FAA-AM-71-20]
Determination of relationship between several
measures of field independence and performance
on real-life visual detection problem N71-32825
[AD-724115]
Color and illuminance effects on visual space
perception N71-33138
[AD-724623]
Human factors engineering in optimizing visual
perception of sonar and radar displays N71-33187
[AD-723992]
- VISUAL STIMULI**
Threshold electrical phosphene dependence on
impulse duration and stimulation frequency in
subjects adapted to darkness A71-37444
Increment thresholds for foveally viewed square
and circular visual stimuli, suggesting
availability of more than one spatial
integration pattern A71-38277
Detectability measurement of foveal stimulus,
suggesting nonuniformity of retinal illuminance
in visual task A71-38278
Human visual cerebral cortex potentials evoked by
sinusoidally modulated field under stabilized
and unstabilized conditions A71-38279
Stimulus patterns spatial intervals and line
thickness effects on stabilized retinal images A71-38280
Visual evoked potential relationship to apparent
size reduction of invariant retinal image A71-38281
Visually evoked cerebral cortex responses to on-
and off-set of patterned light and contour
density and sharpness in humans A71-38282
Hue shifts by intermittent stimulation, suggesting
interaction between stimulus intermittency and
temporal color coding in visual system A71-38283
Visual sensations produced by cosmic ray muons
passing in different directions through human
eyes and head A71-38677
Surround luminance effect on relative perceptual
latency of response, using test stimuli confined
to rod free area of fovea A71-38774
Visual attention automatization due to repeated
stimulus experience, noting fixation rate
habituation concomitance with fixations spatial
distribution uncertainty reduction A71-39545
Stereoscopic vision and depth discrimination tests
in cats, using conditioned suppression and rod-
like shadow disparity stimuli A71-39958

VISUAL TASKS

Prediction of human reaction time to light flashes
[AD-724001] N71-33087

VISUAL TASKS

Detectability measurement of foveal stimulus,
suggesting nonuniformity of retinal illuminance
in visual task A71-38278

Low frequency vibration effects on visual acuity
of pilot performing visual task
[ISVR-TR-49] N71-32864

VITON

Design and fabrication of viton gloves for use in
sterile nitrogen atmospheric processing cabinet
of Lunar Receiving Laboratory
[NASA-CR-115112] N71-31608

VOICE COMMUNICATION

Analog to digital converters for voice signal
analysis
[JPRS-53606] N71-32009

VOICE DATA PROCESSING

Analog to digital converters for description and
recognition of voice signals
N71-32011

VOLUME

Cell volume analyzer for sensing individual blood
cells and plotting number as function of size
A71-38824

Electrocardiograph electrode placements for best
R-wave amplitude correlation with respiratory
volume
[AD-713833] N71-31614

Red cell mass and plasma volume changes noted in
hypodynamic states of bed rest and water
immersion compared to changes observed during
earth orbital missions
N71-33253

VOLUMETRIC ANALYSIS

Physiological responses of burro Equus asinus to
oxygen lack in mountain altitudes, studying red
blood cell and plasma volumes
A71-38560

W

WATER

Hamster body fat, water and density measurements
by dilution method and air displacement
technique, comparing to determination by direct
chemical analysis upon sacrificing
A71-38555

Red cell mass and plasma volume changes noted in
hypodynamic states of bed rest and water
immersion compared to changes observed during
earth orbital missions
N71-33253

Physiological effects of water immersion and
effectiveness of space flight deconditioning
countermeasures
N71-33272

Effects of posture on body fluid circulation and
long term immersion effects on physiological
mechanisms
N71-33273

Characteristics of water environment and
relationship to biogeocenology
N71-33511

WATER CONSUMPTION

Chronic centrifugation effects on water intake and
urine output in mice, considering food intake
and growth rate
A71-38984

WATER POLLUTION

Analysis of water pollution and application of
biogeocenology techniques to eliminate effects
of water pollution
N71-33508

WATER RECLAMATION

Composition, and chemical, physical, and
concentrative properties of human urine
[NASA-CR-1802] N71-32520

Polyvinyl chloride membrane vapor diffusion urine
water reclamation system design and performance
tests for flight systems
[NASA-CR-111932] N71-33400

WATER TREATMENT

Analysis of water pollution and application of
biogeocenology techniques to eliminate effects
of water pollution
N71-33508

SUBJECT INDEX

WATER VAPOR

Amino silica gels absorption properties with
respect to carbon dioxide, hydrogen sulfide and
water vapor, comparing affinity
A71-39233

Polyvinyl chloride membrane vapor diffusion urine
water reclamation system design and performance
tests for flight systems
[NASA-CR-111932] N71-33400

WAVE PROPAGATION

Small pressure wave transmission in abdominal
venae cavae of dogs in mathematical model
development for viscoelastic behavior of large
veins
A71-38987

WAVELENGTHS

Wavelength discrimination from color naming by
young adults with normal visual acuity and color
vision
A71-38285

WEIGHT (MASS)

Radioactive dilution estimation of total skeletal
mass in human body
N71-33259

WEIGHTLESSNESS

Human response to space environment, discussing
prolonged weightlessness, extravehicular work
and lunar surface activity
A71-37492

Physicotechnical and biomedical aspects of human
efficiency under weightlessness, discussing
physical exercise role in adaptation
A71-39217

Measurement of changes in musculoskeletal system
under hypodynamic and hypogravic conditions
N71-33257

Weightlessness effects on human sensorimotor
performance and locomotion
N71-33452

WEIGHTLESSNESS SIMULATION

Conference on aerospace environments, manned space
flight, weightlessness simulation,
musculoskeletal and cardiovascular systems, bone
loss, mineral metabolism, and hematology
[NASA-SP-269] N71-33251

Physiological effects of water immersion and
effectiveness of space flight deconditioning
countermeasures
N71-33272

Research and development, weightlessness
simulation, calcium metabolism, manned space
flight, pressure suits, immobilization, and
aerospace medicine
N71-33275

WIND EFFECTS

Cold climate clothed human windchill tables,
considering various heat transfer modes and skin
temperature
A71-39205

WORK CAPACITY

Mental work capacity investigation methodology,
including Kekcheev, Kosilov, Zinchenko,
Pratusevich and Kraepelin tests
A71-37446

WORK-REST CYCLE

Electroencephalographic evaluation of brain
functions disturbances in response to stress in
flying personnel, relating fatigue and rest
periods allocation
A71-38223

Human performance and recovery in man machine
systems of continuous operations and work/rest
schedules
[AD-723430] N71-32331

Z

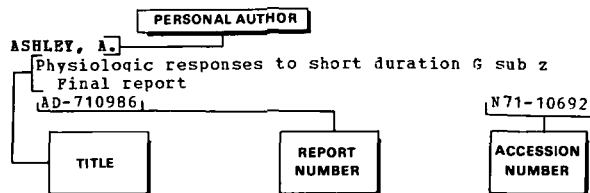
ZOND SPACE PROBES

Biological experiments on plants, animals and
bacteria aboard Zond 5, 6 and 7 space probes
A71-39134

Personal Author Index

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Suppl. 95) NOVEMBER 1971

Typical Personal Author Index Listing



The title of the document is used to provide the user with a brief description of the subject matter. The NASA or AIAA accession number is included in each entry to assist the user in locating the abstract in the abstract section of this supplement. If applicable, a report number is also included as an aid in identifying the document.

A

- ABELSON, D.**
A simple method of recording heart sounds and murmurs
A71-37234
- ABENDSCHEIN, W. P.**
Nondestructive measurement of some physical properties of bone
N71-33261
- AGHEMO, P.**
Effect of alkalosis on performance and lactate formation in supramaximal exercise
A71-38888
- AIZIKOV, G. S.**
Reflex activity of spinal marrow in intact and labyrinthectomized animals subjected to radial accelerations
A71-39221
- ALBUS, J. S.**
A model for memory in the brain
[NASA-TN-D-6456]
N71-32474
- ALEXANDER, J. M.**
Repetitive excursion dives from saturated depths on helium-oxygen mixtures. Phase 3 - Saturation depth 300 feet
[AD-723172]
N71-32602
Repetitive excursion dives from saturated depths on helium-oxygen mixtures. Phase 4 - Saturation depth 500 feet, saturation depth 600 feet
[AD-723173]
N71-32632
Repetitive excursion dives from saturated depths on helium-oxygen mixtures. Phase 2 - Saturation depth 200 feet, saturation depth 150 feet
[AD-723171]
N71-32770
- ALLUISI, E. A.**
Reliability and correlates of a three-phase code transformation task /3P-COTRAN/
A71-39073
- ALPERT, S. M.**
Ozone tolerance studies utilizing unilateral lung exposure
A71-38558
Effects of exposure to ozone on defensive mechanisms of the lung
A71-38559
- ALTLAND, P. D.**
Effects of polycythemia and altitude hypoxia on rat heart and exercise tolerance
A71-38980
- AMBLER, E. K.**
The application of college and flight background questionnaires as supplementary noncognitive

- measures for use in the selection of student naval aviators
[AD-717941]
N71-31620
Replacement air group performance as a criterion for naval aviation training
[AD-718848]
N71-31621
- ANGEL, R. W.**
Tracking errors amended without visual feedback
A71-37545
- ANIKEEVA, I. D.**
Results of the combined action of vibration and gamma irradiation on chlorella
A71-39237
- ANIKEYEVA, I. D.**
Results of combined exposure of Chlorella to vibration and gamma irradiation
N71-33472
- ANLIKER, M.**
Transmission of small pressure waves in the canine vena cava
A71-38987
- ANTIPOV, V. V.**
Results of biological studies performed on the Zond 5, Zond 6, and Zond 7 stations
A71-39134
Effect of conditions of space flight on station 'Zond-5' on seeds, onions, and tradescantia plants
A71-39605
- ARTEMOV, A. V.**
Changes in human EEG during mental visualization of motions
A71-37445
- ARTS, M. G. J.**
On the instantaneous measurement of bloodflow by ultrasonic means
A71-39262
- ASANO, Y.**
The maturation of the circadian rhythms of brain norepinephrine and serotonin in the rat
A71-38071
- ASHWOOD-SMITH, M.**
Applications of cryogenics to biology and medicine
A71-39252
- AUCHINCLOSS, J. H., JR.**
Determination of maximal oxygen uptake with unsteady-state measurements
A71-38553
- AVETISYANTS, B. L.**
Amino silica gels - Regeneratable sorbents for absorbing carbon dioxide, hydrogen sulfide, and water vapor
A71-39233
- AYZIKOV, G. S.**
Spinal cord reflex activity in normal and labyrinthectomized animals under the influence of radial accelerations
N71-33456

B

- BACK, K. C.**
Spontaneous cardiac arrhythmias induced by bromotrifluoromethane
[AD-723645]
N71-31733
- BACON, E. J.**
Planning, evaluation and analytical studies to implement planetary quarantine requirements
Quarterly progress report
[NASA-CR-121423]
N71-33221
- BAEVSKII, R. M.**
Methodology of mental work capacity investigation
A71-37446
- BAGRASH, P. M.**
Patterns of spatial integration in the detection

- of compound visual stimuli
A71-38277
- BALAKHOVSKII, I. S.**
Relation between the elimination of various cations by the kidneys during a disturbance of the salt balance
A71-39232
- BALAKHOVSKII, I. S.**
Correlation between renal excretion of different cations under conditions of an impaired mineral balance
N71-33467
- BALDWIN, R. D.**
Aircraft recognition performance of crew chiefs with and without forward observers
[AD-714213]
N71-31625
- BALE, R. M.**
The application of college and flight background questionnaires as supplementary noncognitive measures for use in the selection of student naval aviators
[AD-717941]
N71-31620
- Replacement air group performance as a criterion for naval aviation training
[AD-718848]
N71-31621
- BALLARD, R. W.**
Phosphoenolpyruvate - A new inhibitor of phosphoribulokinase in *Pseudomonas facilis*
A71-38820
- BARAR, A. S.**
Changes in human retinal circulation during transverse acceleration
N71-33463
- BARER, A. S.**
Changes in human retinal blood circulation under transversely directed acceleration
A71-39228
- BAULE, G. H.**
Determination of maximal oxygen uptake with unsteady-state measurements
A71-38553
- BAUMANN, R.**
Plasma renin activity in essential hypertonic and normotonic persons exposed to exogenous stress
A71-38893
- BAVRO, G. V.**
Establishment of physiological principles of rational heat removal in an individual isolating suit
A71-39224
- BAYERS, J. H.**
The effects of long-term bed rest on mineral metabolism
N71-33266
- BEAN, J. W.**
Regional cerebral blood flow, O₂, and EEG in exposures to O₂ at high pressure
A71-38557
- BECKER, R. W.**
A study of sensitivity to noise Final report
[EQ-71-4]
N71-32572
- BEELER, G. W.**
Living human dynamic response to minus G sub x impact acceleration. 2 - Accelerations measured on the head and neck
[AD-717130]
N71-31616
- BEKEY, G. A.**
Identification of human operator models by stochastic approximation
A71-37648
- BELKANIYA, G. S.**
Role of motor and vestibular analysors and frontal hypothalamus in the compensation for gravitational loads during orthostasis
A71-39223
- BELKANIYA, G. S.**
Importance of the motor and vestibular analyzers and frontal hypothalamus in compensating a gravitational load during orthostasis
N71-33458
- BENGEL, H. H.**
Water intake and urine output of mice during chronic centrifugation
A71-38984
- BERGHAGE, T. E.**
Revised tables of appropriate oxygen percentages for selected partial pressures at various depths Final research report
[AD-724282]
N71-33125
- BERNBAUM, D.**
A simple method of recording heart sounds and murmurs
A71-37234
- BETZ, A.**
Cyclic phenomena in biological and biochemical systems
A71-39475
- BEYER, R. E.**
Tissue temperatures and whole-animal oxygen consumption after exercise
A71-38981
- BLACK, A. M. S.**
Stagnant asphyxia in the carotid body of the cat
A71-39443
- BLAKE, R. R.**
Stereoscopic vision in the cat
A71-39958
- BLOMQUIST, G.**
Effects of bed rest on the oxygen transport system
N71-33262
- BOBKOVA, N. N.**
Cytogenetic studies related to a space flight of man
A71-39227
- BOND, W. W.**
Relative frequency distribution of D sub 125 C values for spore isolates from the Mariner- Mars 1969 spacecraft
A71-37646
- BORDA, R. P.**
Periodicity of high-order functions in the CNS Final progress report, year ending 30 Jun. 1971
[NASA-CR-121409]
N71-33437
- BOWMAN, R. P.**
Determination of maximal oxygen uptake with unsteady-state measurements
A71-38553
- BOYD, H. A.**
Peer ratings as predictors of success in military aviation
[AD-724695]
N71-33149
- BOYLES, W. R.**
Prediction of Army aviator performance - Description of a developing system
[AD-724696]
N71-33148
- Peer ratings as predictors of success in military aviation
[AD-724695]
N71-33149
- BOYNE, A. W.**
Simultaneous calibration of gas analyzers and meters
A71-38566
- BRADLEY, P. D.**
Scientific publications and presentations relating to planetary quarantine. Volume 5 - The 1970 supplement
[NASA-CR-121325]
N71-32231
- BRAMS, W. H.**
Enzyme activity in terrestrial soil in relation to exploration of the Martian surface Semiannual progress report
[NASA-CR-121446]
N71-33232
- BRANAM, G.**
Determinants of marathon running success
A71-38890
- BRECHER, G. A.**
Effect of a moving optical environment on the subjective median
[FAA-AM-71-22]
N71-32081
- BRECHER, M. H.**
Effect of a moving optical environment on the subjective median
[FAA-AM-71-22]
N71-32081
- BROCKWAY, J. H.**
Simultaneous calibration of gas analyzers and meters
A71-38566
- BROOKS, G. A.**
Tissue temperatures and whole-animal oxygen consumption after exercise
A71-38981
- BROSOWSKI, K. H.**
Plasma renin activity in essential hypertonic and normotonic persons exposed to exogenous stress
A71-38893
- BUCK, L.**
Human factors engineering
N71-32622

- BUCKLIN, B. L.
Field dependence and visual detection ability
[AD-724115] N71-32825
- BULUSU, L.
Assessment of bone mass in relation to inactivity
N71-33256
- BURNS, R. G.
Enzyme activity in terrestrial soil in relation to
exploration of the Martian surface Semiannual
progress report
[NASA-CR-121446] N71-33232
- BURUSHKINA, T. N.
Amino silica gels - Regeneratable sorbents for
absorbing carbon dioxide, hydrogen sulfide, and
water vapor
A71-39233

C

- CAMERON, J. R.
Skeletal status and soft tissue composition of
astronauts. Determination of body composition
in vivo Progress report, 15 Jun. 1970 - 15 Jun.
1971
[NASA-CR-121415] N71-33223
Some physical methods of skeletal evaluation
N71-33257
- CAMPORRESI, E.
Occurrence of a deep breath after a period of
airway occlusion
A71-39040
- CARDU, B.
The influence of spatial intervals and thickness
of lines of stimulus patterns on stabilized
images
A71-38280
- CHARMAN, W. N.
Visual sensations produced by cosmic ray muons
A71-38677
- CHEBYSEV, A. E.
Human-operator models in the investigation of
spacecraft manual control
A71-39226
- CHEKASOV, V. K.
Amino silica gels - Regeneratable sorbents for
absorbing carbon dioxide, hydrogen sulfide, and
water vapor
A71-39233
- CHEMSEIDE, H. B.
An index for describing food utility
A71-37575
- CHESTER, E. H.
Pulmonary gas transport characterization by a
dynamic model
A71-39441
- CHILES, W. D.
A non-verbal technique for the assessment of
general intellectual ability in selection of
aviation personnel
[FAA-AM-71-28] N71-32434
- CHINN, K. S. K.
Alterations in serum and extracellular
electrolytes during high-altitude exposure
A71-38562
- CHRISTOPHE, J.
Amino acid levels in plasma, liver, muscle, and
kidney during and after exercise in fasted and
fed rats
A71-38982
- CLARK, M. E.
Water intake and urine output of mice during
chronic centrifugation
A71-38984
- COATES, G. D.
Reliability and correlates of a three-phase code
transformation task /3P-COTRAN/
A71-39073
- COATS, A. C.
Periodicity of high-order functions in the CNS
Final progress report, year ending 30 Jun. 1971
[NASA-CR-121409] N71-33437
- COFFIN, D. L.
Effects of exposure to ozone on defensive
mechanisms of the lung
A71-38559
- COGGLE, J. E.
Biological effects of radiation
A71-38048

- COHEN, R.
Diffusion component of alveolar-arterial oxygen
pressure difference in man
A71-38556
- COHN, P. F.
Diastolic heart sounds and filling waves in
coronary artery disease
A71-37550
- COLEMAN, B.
New studies on the first heart sound
A71-37232
- COLLINS, H. D.
Various holographic scanning configurations for
under sodium viewing
[BNWL-1558] N71-33486
- COLLINS, W. E.
Alcohol and disorientation-related responses. 3 -
Effects of alcohol ingestion on tracking
performance during angular acceleration
[FAA-AM-71-20] N71-32433
- COBLISS, E. L. R.
Estimate of the inherent channel capacity of the
ear
A71-39769
- COSTILL, D. L.
Determinants of marathon running success
A71-38890
- COULAN, C. H.
Regional differences in pleural and esophageal
pressures in head-up and head-down positions
A71-38564
- COULSON, J.
Regional cerebral blood flow, O₂, and EEG in
exposures to O₂ at high pressure
A71-38557

D

- DANIEL, E. E.
Cell contacts in duodenal smooth muscle layers
A71-38985
- DANILICHEV, I. A.
Amino silica gels - Regeneratable sorbents for
absorbing carbon dioxide, hydrogen sulfide, and
water vapor
A71-39233
Aminosilicagels - Regeneratable sorbents for
absorbing carbon hydrogen sulfide and water
vapor
N71-33468
- DARREL, B.
Design and first results of a new phonocardiograph
A71-37231
- DAVIDOV, B. I.
Influence of abdomen and head shielding during
gamma-irradiation of dogs on the content of
protein fractions in the blood serum
A71-39222
Effect of abdominal or head region shielding
during gamma irradiation of dogs on the content
of blood serum protein fractions
N71-33457
- DEGRE, S.
Evolution of some circulatory, respiratory, and
metabolic parameters during physical exercise
performed in a noisy environment
A71-38889
- DELONE, W. L.
Effect of conditions of space flight on station
'Zond-5' on seeds, onions, and tradescantia
plants
A71-39605
- DEMIN, W. N.
Total content of protein and the quantity of basic
proteins in the neurons and neuroglia of the
supraoptical and red brain nuclei of rats during
natural sleep and when deprived of the
paradoxical phase of sleep
A71-38545
- DENOLIN, H.
Evolution of some circulatory, respiratory, and
metabolic parameters during physical exercise
performed in a noisy environment
A71-38889
- DICARA, L. V.
Learning of cardiovascular responses - A review
and a description of physiological and
biochemical consequences
A71-39548

- DIETLEIN, L. F.**
Spaceflight deconditioning - An overview of manned
spaceflight results
N71-33252
- DILL, D. B.**
Red blood cell and plasma volumes in the burro,
Equus asinus - Desert and mountain
A71-38560
- DOLGUN, Z. S.**
Influence of prolonged hypokinesia on the
serotonin metabolism of rats
A71-39218
Effect of prolonged hypokinesia on serotonin
metabolism in rats
N71-33453
- DONALDSON, C. L.**
The effects of long-term bed rest on mineral
metabolism
N71-33266
- DUCHOW, G.**
Cell contacts in duodenal smooth muscle layers
A71-38985
- DUDEK, R. A.**
Performance, recovery and man-machine
effectiveness Semiannual progress report, 1
Sep. 1970 - 28 Feb. 1971
[AD-723430]
N71-32331
- DUNSKY, I. L.**
Evaluation of retinal thresholds for C.W. laser
radiation
A71-38284
- DUPUIS, H.**
Anthropotechnology
[DLR-MITT-70-11]
N71-33970
- DYLLIS, N. V.**
The structure and function of biogeocenoses
N71-33509

E

- EDDY, D.**
Determinants of marathon running success
A71-38890
- ELDRIDGE, P. L.**
Relationship between phrenic nerve activity and
ventilation
A71-38983
- ELLIOTT, R. H.**
Lighting factors affecting the visibility of a
moving display
[NASA-CR-119640]
N71-31618
- EMELIANOV, M. D.**
Reflex activity of spinal marrow in intact and
labyrinthectomized animals subjected to radial
accelerations
A71-39221
- ENGELKEN, E. J.**
Automatic detection and display of arrhythmias on
a desk-top analog computer Final report, Oct.
1968 - Oct. 1969
[AD-711039]
N71-31612
- EWING, C. L.**
Living human dynamic response to minus G sub x
impact acceleration. 2 - Accelerations measured
on the head and neck
[AD-717130]
N71-31616

F

- FAULKNER, J. A.**
Tissue temperatures and whole-animal oxygen
consumption after exercise
A71-38981
- FAVERO, M. S.**
Relative frequency distribution of D sub 125 C
values for spore isolates from the Mariner- Mars
1969 spacecraft
A71-37646
- FEIGEN, L. P.**
Design and first results of a new phonocardiograph
A71-37231
New studies on the first heart sound
A71-37232
Frequency distribution of the heart sounds in
normal man
A71-38803
- FICHTBAUER, S.**
Anthropotechnology
[DLR-MITT-70-11]
N71-33970
- FINEGAN, R. E.**
Action of pharmacologic agents in experimental
cardiac tamponade
A71-38968
- FIORICA, V.**
Physiological responses of low time private pilots
to cross-country flying
[FAA-AH-71-23]
N71-32082
- FISCHER, C. L.**
Hematologic implications of hypodynamic states
N71-33253
- FISCHER, H.-D.**
An analogous electronic functional model of the
external functions of primary biological
receptor elements
A71-38894
- FISCHLER, M.**
Tracking errors amended without visual feedback
A71-37545
- FLINN, E. T.**
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 3 - Saturation
depth 300 feet
[AD-723172]
N71-32602
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 4 - Saturation
depth 500 feet, saturation depth 600 feet
[AD-723173]
N71-32632
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 2 - Saturation
depth 200 feet, saturation depth 150 feet
[AD-723171]
N71-32770
- FORSBERG, S. A.**
Relations between pressure in pulmonary artery,
left atrium, and left ventricle with special
reference to events at end diastole
A71-38296
- FOX, R.**
Stereoscopic vision in the cat
A71-39958
- FREDERICKSON, E. W.**
Aircraft recognition performance of crew chiefs
with and without forward observers
[AD-714213]
N71-31625
- FREED, J. J.**
Studies of the effects of ultraviolet radiation on
cell structure and behavior Comprehensive
report, 1967 - 1970
[NYO-2356-43]
N71-33934
- FREUND, H.**
Analysis of the factors determining the slow
variations in heart rate during and after muscle
exercise
A71-38891
- FRIDMAN, V. E.**
Automatic regulation of the volumetric blood flow
rate during artificial blood circulation
A71-38641
- FROST, J. D., JR.**
Periodicity of high-order functions in the CNS
Final progress report, year ending 30 Jun. 1971
[NASA-CR-121409]
N71-33437
- FUCHS, A. F.**
The activity of single trochlear nerve fibers
during eye movements in the alert monkey
A71-37413
- FURST, A.**
An index for describing food utility
A71-37575
- FURST, C. J.**
Automatizing of visual attention
A71-39545

G

- GARDNER, D. E.**
Effects of exposure to ozone on defensive
mechanisms of the lung
A71-38559
- GARLAND, H.**
Tracking errors amended without visual feedback
A71-37545
- GARRETT, J. W.**
A collation of anthropometry. Volume 2 - I-Z and
index
[AD-723630]
N71-32715
- GASAWAY, D. C.**
Noise within the Bell UH-7P helicopter during
flight Final report, Apr. - Jun. 1970

- [AD-713830] N71-31613
GAUER, O. H.
 Body fluid regulation during immersion N71-33273
- GAZENKO, O. G.**
 Results of biological studies performed on the
 Zond 5, Zond 6, and Zond 7 stations A71-39134
 From Dokuchayev's natural zones to space
 ecosystems N71-33505
- GERATHEWOHL, S. J.**
 Civil aeromedical standards for general use
 aerospace transportation vehicles - The space
 shuttle follow-on [FAA-AM-71-33] N71-32083
- GILBERT, M.**
 The influence of spatial intervals and thickness
 of lines of stimulus patterns on stabilized
 images A71-38280
- GILBERT, R.**
 Determination of maximal oxygen uptake with
 unsteady-state measurements A71-38553
- GILSON, R. D.**
 Lighting factors affecting the visibility of a
 moving display [NASA-CR-119640] N71-31618
 Alcohol and disorientation-related responses. 3 -
 Effects of alcohol ingestion on tracking
 performance during angular acceleration [FAA-AM-71-20] N71-32433
- GLASER, R. M.**
 Cortical responses of awake cat to narrow-band FM
 noise stimuli A71-39767
- GLAZUNOV, N. I.**
 Behavioral, selection experiments cited N71-32089
- GOLDBURG, S. N.**
 Measurement of the time required to react to the
 appearance and disappearance of short sensory
 /auditory/ stimuli for the purpose of measuring
 the duration of perception A71-37283
- GONZALEZ, C.**
 Planetary quarantine considerations for outer
 planet missions [AAS PAPER 71-122] A71-37917
- GORDON, J. G.**
 Simultaneous calibration of gas analyzers and
 meters A71-38566
- GORIUNOVA, T. I.**
 Human efficiency under weightlessness conditions A71-39217
- GORLIN, R.**
 Diastolic heart sounds and filling waves in
 coronary artery disease A71-37550
- GORODINSKII, S. M.**
 Establishment of physiological principles of
 rational heat removal in an individual isolating
 suit A71-39224
- GORODINSKIY, S. M.**
 Formulation of physiological principles for
 rational heat transfer in individual insulating
 gear N71-33459
- GRAFF, CH.**
 Plasma renin activity in essential hypertonic and
 normotonic persons exposed to exogenous stress A71-38893
- GRAUDENZ, J. Y.**
 An index for describing food utility A71-37575
- GRAY, E. W.**
 Simulation of passive thermal behavior of a
 cooling biological system - Entry into
 hibernation A71-38199
- GRAYBELL, A.**
 Evidence for a test of dynamic otolith function
 considered in relation to responses from a
 patient with idiopathic progressive vestibular
 degeneration [AD-722318] N71-31768
- GREEN, J. A.**
 Human psychomotor performance in a rotating
 environment as measured by the Langley complex
 coordinator and the decision response time
 devices [AIAA PAPER 71-887] A71-37275
- GREEN, R. H.**
 Effects of aeolian erosion on microbial release
 from solids [NASA-CR-121422] N71-33380
- GRIFFEN, P. M.**
 Design and first results of a new phonocardiograph
 A71-37231
- GRIFFIN, M. J.**
 Pilot visual acuity during helicopter flight
 [ISVR-TR-44] N71-31660
 Some effects of the vibration of reading material
 upon visual performance [ISVR-TR-49] N71-32864
- GRINIO, L. P.**
 Cytogenetic studies related to a space flight of
 man A71-39227
 Cytogenetic investigations in relation to manned
 space flight N71-33462
- GRUSHKO, G. S.**
 Certain generalizations in a mathematical model of
 vision N71-32013
- GUEDRY, P. E., JR.**
 Evidence for a test of dynamic otolith function
 considered in relation to responses from a
 patient with idiopathic progressive vestibular
 degeneration [AD-722318] N71-31768
 Alcohol and disorientation-related responses. 3 -
 Effects of alcohol ingestion on tracking
 performance during angular acceleration [FAA-AM-71-20] N71-32433
- GUSEV, G. P.**
 Relation between the elimination of various
 cations by the kidneys during a disturbance of
 the salt balance A71-39232
- GUSTAW, E. A.**
 Effects of aeolian erosion on microbial release
 from solids [NASA-CR-121422] N71-33380

H

- HABER, E.**
 A fraction of the ventricular myocardium that has
 the specificity of the cardiac beta-adrenergic
 receptor /norepinephrine binding/displacement/
 A71-37900
- HACKERSON, E. C.**
 Aircraft recognition performance of crew chiefs
 with and without forward observers [AD-714213] N71-31625
- HANLEY, H. G.**
 K/plus/, osmolality and subcutaneous adipose
 tissue blood flow A71-39379
- HANNOH, J. P.**
 Alterations in serum and extracellular
 electrolytes during high-altitude exposure A71-38562
- HARDT, H. E.**
 Adaptation to displaced vision - A change in the
 central control of sensorimotor coordination A71-37543
- HARRISON, D. C.**
 Action of pharmacologic agents in experimental
 cardiac tamponade A71-38968
- HARTLEY, L. H.**
 Renin, norepinephrine, and epinephrine responses
 to graded exercise A71-38551
- HARTRODT, W.**
 Plasma renin activity in essential hypertonic and
 normotonic persons exposed to exogenous stress A71-38893
- HATTNER, R. S.**
 The effects of long-term bed rest on mineral
 metabolism N71-33266

- HAUSCH, H. G.
Configuring the orbital centrifuge systems for
space shuttle compatibility
[AIAA PAPER 71-860] A71-37274
Human psychomotor performance in a rotating
environment as measured by the Langley complex
coordinator and the decision response time
devices
[AIAA PAPER 71-887] A71-37275
- HEBBELINCK, H.
Amino acid levels in plasma, liver, muscle, and
kidney during and after exercise in fasted and
fed rats A71-38982
- HEISKANEN, T.
Right heart, pulmonary, and left heart blood
volumes determined by analogue computer analysis
of radiocardiograms in normal subjects and
patients with mitral stenosis A71-38801
Analogue model for the analysis of
radiocardiograms A71-38802
- HELD, R.
Adaptation to displaced vision - A change in the
central control of sensorimotor coordination A71-37543
- HENDERSON, R. H.
Cell contacts in duodenal smooth muscle layers A71-38985
- HERMAN, H. V.
Diastolic heart sounds and filling waves in
coronary artery disease A71-37550
- HERZON, J. H.
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 2 - Saturation
depth 200 feet, saturation depth 150 feet
[AD-723171] N71-32770
- HERZENBERG, L. A.
An improved cell volume analyzer A71-38824
- HETHERINGTON, H. W.
The summation-dial, a vectorial representation of
time series data A71-39480
- HEWKA, P. V.
Research on avalanche type semiconductor radiation
detectors Semiannual report, Jul. - Dec. 1970
[NYO-3246-TA-8] N71-33775
- HIGHMAN, B.
Effects of polycythemia and altitude hypoxia on
rat heart and exercise tolerance A71-38980
- HITTELMAN, K. J.
Tissue temperatures and whole-animal oxygen
consumption after exercise A71-38981
- HORSNAN, A.
Assessment of bone mass in relation to inactivity N71-33256
- HOUTGAST, T.
Psychophysical evidence for lateral inhibition in
hearing [IZF-1971-8] N71-33859
- HULETT, H. R.
An improved cell volume analyzer A71-38824
- HULLEY, S. B.
The effects of long-term bed rest on mineral
metabolism N71-33266
- HUMPHREYS, C. H.
The application of heat stress indices A71-37483
- HURST, D. J.
Effects of exposure to ozone on defensive
mechanisms of the lung A71-38559
- HUSAK, V.
Some physical problems of lung scanning A71-39072
- HUTCHINSON, R. R.
Effects of long-term shock and associated stimuli
on aggressive and manual responses A71-39070
- HYATT, G. W.
Nondestructive measurement of some physical
properties of bone
- HYATT, K. H.
Hemodynamic and body fluid alterations induced by
bedrest N71-33261
N71-33263
- IAKOVLEVA, I. IA.
Specific features of reactions of the nasal
vascular system during 120-day hypokinesia A71-39229
- INGLIS, L. P.
Why the double standard - A critical review of
Russian work on the hazards of microwave
radiation A71-38442
- IVANOV, G. A.
Establishment of physiological principles of
rational heat removal in an individual isolating
suit A71-39224
- IVANOVA, M. P.
Changes in human EEG during mental visualization
of motions A71-37445
- JACOBSON, J. H.
Positive and negative deflections in the off
response of the electroretinogram in man A71-38058
- JANSEN, W. H.
Psychophysical measures of sensory sensitivity
[IZF-1971-13] N71-33722
- JETHON, Z.
Ergonomics in aviation A71-38016
- JOHNSON, P. C.
Hematologic implications of hypodynamic states N71-33253
- JOHNSON, R. E.
Disclosure by dietary modification of an
exercise-induced protein catabolism in man A71-38552
- JONES, L. G.
Renin, norepinephrine, and epinephrine responses
to graded exercise A71-38551
- JOWSEY, J.
Bone at the cellular level - The effects of
inactivity N71-33258
- JURIST, J. H.
Some physical methods of skeletal evaluation N71-33257
- KAMSHILOV, H. H.
Biogeocenology and water treatment N71-33508
- KARBAUM, H.
The question of an impairment of hearing due to
occupational causes for cockpit crews in civil
aviation A71-38222
- KARETZKY, H. S.
The effect of oxygen administration on gas
exchange and cardiopulmonary function in normal
subjects A71-39442
- KARLSSON, J.
Diet, muscle glycogen, and endurance performance A71-38554
- KARR, A. C.
Color, differential luminance and subjective
distance [AD-724623] N71-33138
- KARTSEV, I. D.
Investigation of motor reaction parameters A71-37447
- KATKOVSKII, B. S.
Changes in cardiac ejection caused by 15-day bed
rest A71-39231
- KATKOVSKIY, B. S.
Change in cardiac ejection under the influence of

- 15-day bed confinement
N71-33466
- KATUNIAN, P. I.
Morphological changes in the myocardium under the
action of accelerations for several hours
A71-39235
- KATUNIAN, P. I.
Morphological changes in myocardium during
multihour accelerations
N71-33470
- KAWASAKI, K.
Positive and negative deflections in the off
response of the electroretinogram in man
A71-38058
- KAZARIN, L. E.
Disuse atrophy in Macaca Mulatta and its
implications for extended space flight
N71-33260
- KEESEY, U. T.
Comparison of human visual cortical potentials
evoked by stabilized and unstabilized targets
A71-38279
- KEIGHLEY, J. F.
The effect of oxygen administration on gas
exchange and cardiopulmonary function in normal
subjects
A71-39442
- KELLAWAY, P.
Periodicity of high-order functions in the CNS
Final progress report, year ending 30 Jun. 1971
[NASA-CR-121409]
N71-33437
- KENNEDY, K. W.
A collation of anthropometry. Volume 2 - I-Z and
index
[AD-723630]
N71-32715
- KERR, L. G.
Patterns of spatial integration in the detection
of compound visual stimuli
A71-38277
- Evidence of role of size-tuned mechanisms in
increment threshold task
A71-38278
- KISELEV, R. K.
Relation between the elimination of various
cations by the kidneys during a disturbance of
the salt balance
A71-39232
- KLINGER, J.
An analogous electronic functional model of the
external functions of primary biological
receptor elements
A71-38894
- KODAMA, A. M.
In vivo and in vitro determinations of body fat
and body water in the hamster
A71-38555
- KOENIG, H.
Biological effects of extremely low frequency
electrical phenomena in the atmosphere
A71-39478
- KOLCHENKO, N. V.
Typological features of human higher nervous
activity and their significance in professional
selection
A71-37775
- KOLNSBERG, H. J.
Design and fabrication of a flight concept
prototype vapor diffusion water reclamation
system
[NASA-CR-111932]
N71-33400
- KOLOKOLOV, A. S.
Modelling the adaptation of a neuron and
spontaneous activity of neuron net
N71-32033
- KOMOTSKII, R. V.
Human-operator models in the investigation of
spacecraft manual control
A71-39226
- KOMOTSKIY, R. V.
Models of a man-operator in investigating
spaceship manual control
N71-33461
- KOROBOVA, A. A.
Human efficiency under weightlessness conditions
A71-39217
- Man's performance during weightlessness
N71-33452
- KOTCHEN, T. A.
Renin, norepinephrine, and epinephrine responses
- to graded exercise
A71-38551
- KOVALENKOVA, V. K.
Optimization of the mineral composition of the
nutrient medium for hydrogen bacteria
A71-39236
- Optimization of the mineral composition of a
nutrient medium for Hydrogenomonas
N71-33471
- KREBS, M. J.
Predicting human performance 2 - Laws of the
visual reaction time
[AD-724001]
N71-33087
- KREHER, CH.
Plasma renin activity in essential hypertonic and
normotonic persons exposed to exogenous stress
A71-38893
- KREKELER, H.
Alveolar-arterial O₂-pressure difference during
hyperventilation
A71-38200
- KRESSIN, J.
The question of an impairment of hearing due to
occupational causes for cockpit crews in civil
aviation
A71-38222
- KRUPINA, T. N.
Cytogenetic studies related to a space flight of
man
A71-39227
- KRYTER, K. D.
The effects of noise on man
A71-39874
- A study of sensitivity to noise Final report
[EQ-71-4]
N71-32572
- KUDRIAVTSEVA, V. I.
Methodology of mental work capacity investigation
A71-37446
- KULIG, J. W.
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 3 - Saturation
depth 300 feet
[AD-723172]
N71-32602
- Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 2 - Saturation
depth 200 feet, saturation depth 150 feet
[AD-723171]
N71-32770
- KULING, J. W.
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 4 - Saturation
depth 500 feet, saturation depth 600 feet
[AD-723173]
N71-32632
- KUTCHAI, H.
Wider applicability for Hill's advancing front
theory of oxygen uptake
A71-38567
- KUTZNER, R.
Amino acid levels in plasma, liver, muscle, and
kidney during and after exercise in fasted and
fed rats
A71-38982
- KUZMIN, M. P.
Nature of the distribution of intraocular pressure
in healthy humans from 25 to 40 years old
engaged in intellectual work
A71-39234
- KYLSTRA, J. A.
Diffusion component of alveolar-arterial oxygen
pressure difference in man
A71-38556

L

- LANCASTER, M. C.
The effect of total body exercise on the
metabolic, hematologic, and cardiovascular
consequences of prolonged bed rest
N71-33265
- Hematologic aspects of bed rest
N71-33271
- LAPPIN, P. W.
Evaluation of retinal thresholds for C.W. laser
radiation
A71-38284
- LAU, C.
Role of respiratory chemoreceptors in
adrenocortical activation
A71-38986

LAVRENKO, YE. M.

Current tasks of biogeocenology

N71-33502

LAVRENTYEV, G. A.

Using the method of separation and identification of amino acids to detect extraterrestrial life [NASA-TT-F-13765]

N71-32232

LAVROVA, E. A.

Relation between the elimination of various cations by the kidneys during a disturbance of the salt balance

A71-39232

LEACH, C.

Hematologic implications of hypodynamic states

N71-33253

LECOQ, P. R.

The effect of bed rest on glucose regulation in man - Studies in progress

N71-33270

LEEBREK, H. J.

Visual troubles, dustproof and acoustic qualities as they are met with perforated wall covering [IZP-1971-12]

N71-33725

LEFKOWITZ, R. J.

A fraction of the ventricular myocardium that has the specificity of the cardiac beta-adrenergic receptor /norepinephrine binding/displacement/

A71-37900

LEVICH, V. G.

Impulse blocking by an inhomogeneity in an electrochemical model of a nerve

A71-37282

LEWIS, T. R.

Ozone tolerance studies utilizing unilateral lung exposure

A71-38558

Effects of exposure to ozone on defensive mechanisms of the lung

A71-38559

LIGNELL, J.

Regional cerebral blood flow, O₂, and EEG in exposures to O₂ at high pressure

A71-38557

LINDAN, O.

The relationship between the diurnal and meal-driven rhythms of kidney functions in subjects at rest

N71-33268

LISHEVUK, V. O.

Investigation of a mathematical model of the cardiovascular system

A71-37777

LOBBAN, M. C.

Circadian rhythms of renal excretion in human subjects at different latitudes

A71-39477

LOMONACO, T.

Structural arrangement for a biological laboratory in a space station and brief description of a research program on the physiopathology of man in space

A71-37308

LOECKE, R. H.

Simulation of passive thermal behavior of a cooling biological system - Entry into hibernation

A71-38199

LUISADA, A. A.

Design and first results of a new phonocardiograph

A71-37231

New studies on the first heart sound

A71-37232

The second heart sound in normal and abnormal conditions

A71-37233

Frequency distribution of the heart sounds in normal man

A71-38803

LUSCHEI, E. S.

The activity of single trochlear nerve fibers during eye movements in the alert monkey

A71-37413

LUTWAK, L.

Metabolic studies of the Gemini 7 14-day orbital spaceflight

N71-33255

M

MACCANNON, D. M.

Design and first results of a new phonocardiograph

A71-37231

New studies on the first heart sound

A71-37232

MACELROY, E. D.

Phosphoenolpyruvate - A new inhibitor of phosphoribulokinase in *Pseudomonas facillis*

A71-38820

MACK, P. B.

The summation-dial, a vectorial representation of time series data

A71-39480

Bone density changes in the astronauts during spaceflight

N71-33254

MAKAROV, P. O.

Measurement of the time required to react to the appearance and disappearance of short sensory /auditory/ stimuli for the purpose of measuring the duration of perception

A71-37283

MAKSHOV, V. N.

Optimization of the mineral composition of the nutrient medium for hydrogen bacteria

A71-39236

MANHARELLA, L.

Atmospheric stability and aerosol pollution. Proposal of a simple method for evaluating the conditions of air stability [IFA-RDP-36]

N71-32863

MANGINA, D. V.

The physiological cost of flight work

A71-37763

MANUKHIN, B. M.

Dynamics of noradrenaline concentration in the myocardium of rats subjected to high-altitude hypoxia

A71-37393

MARAHAN, G. V.

Human psychomotor performance in a rotating environment as measured by the Langley complex coordinator and the decision response time devices [AIAA PAPER 71-887]

A71-37275

MARBACH, G.

Analysis of the factors determining the slow variations in heart rate during and after muscle exercise

A71-38891

MARGARIA, R.

Effect of alkalosis on performance and lactate formation in supramaximal exercise

A71-38888

MARIANI, M.

Maximal aerobic and anaerobic power and stroke volume of the heart in a subalpine population

A71-38887

MARKIN, V. S.

Impulse blocking by an inhomogeneity in an electrochemical model of a nerve

A71-37282

MARPLES, V.

Middle ear function - A kinematic analysis

A71-38062

MARSHALL, J. H.

Relative frequency distribution of D sub 125 C values for spore isolates from the Mariner- Mars 1969 spacecraft

A71-37646

MARTICORENA, E.

Urinary protein excretion in high-altitude residents

A71-38561

MASON, J. W.

Renin, norepinephrine, and epinephrine responses to graded exercise

A71-38551

MATTESON, H. H.

Effects of surround luminance on perceptual latency in the fovea

A71-38774

MAZESS, R. B.

Some physical methods of skeletal evaluation

N71-33257

- HAZUR, N. G.
Impulse blocking by an inhomogeneity in an
electrochemical model of a nerve
A71-37282
- MC CAIN, C. W., JR.
Color, differential luminance and subjective
distance
[AD-724623] N71-33138
- MC CALLY, M.
Hypogravic and Hypodynamic Environments
[NASA-SP-269] N71-33251
Effects of bed rest on forearm vascular responses
to tyramine and norepinephrine
N71-33264
Immersion techniques and the evaluation of
spaceflight deconditioning countermeasures
N71-33272
- MC CANN, D. R.
Design and fabrication of a flight concept
prototype vapor diffusion water reclamation
system
[NASA-CR-111932] N71-33400
- MC LAREN, A. D.
Enzyme activity in terrestrial soil in relation to
exploration of the Martian surface Semiannual
progress report
[NASA-CR-121446] N71-33232
- MC MILLAN, D. E.
The effects of long-term bed rest on mineral
metabolism
N71-33266
- MCAULAY, I. R.
Cosmic ray flashes in the eye
A71-37299
- MCCLOSKEY, D. I.
Stagnant asphyxia in the carotid body of the cat
A71-39443
- MCGRATH, J. J.
Acclimation response of pigeons to simulated high
altitude
A71-38563
- MEFFERT, H.
Distribution of cholesterol and esterified
cholesterols in the human skin
A71-38892
- MELNICHUK, P. V.
Correlation of the activity of adjacent neurons of
the somatosensory zone of the cat cortex
A71-37392
- MELNIKOV, L. N.
Utilization of color-music during the performance
of an operator under conditions of isolation
A71-39225
- MELTON, C. E.
Physiological responses of low time private pilots
to cross-country flying
[FAA-AM-71-23] N71-32082
- MENSHOVA, V. M.
Amino silica gels - Regeneratable sorbents for
absorbing carbon dioxide, hydrogen sulfide, and
water vapor
A71-39233
- MERRILL, J. T.
An improved cell volume analyzer
A71-38824
- MESSIER, A. A.
The effect of chronic hypercapnia on oxygen
affinity and 2,3-diphosphoglycerate
A71-39440
- MESSIN, R.
Evolution of some circulatory, respiratory, and
metabolic parameters during physical exercise
performed in a noisy environment
A71-38889
- MEYER, P. N.
Water intake and urine output of mice during
chronic centrifugation
A71-38984
- MILIC-EMILI, J.
Occurrence of a deep breath after a period of
airway occlusion
A71-39040
- MILITANO, T. C.
Pulmonary gas transport characterization by a
dynamic model
A71-39441
- MIWAEV, S. A.
Human-operator models in the investigation of
spacecraft manual control
- MISHUSTIN, YE. N.
Microbic cenoses and fertility
N71-33507
- MITCHELL, J. H.
Effects of bed rest on the oxygen transport system
N71-33262
- MITHOEFER, J. C.
The effect of oxygen administration on gas
exchange and cardiopulmonary function in normal
subjects
A71-39442
- MOHLER, S. R.
Civil aeromedical standards for general use
aerospace transportation vehicles - The space
shuttle follow-on
[FAA-AM-71-33] N71-32083
- MOLCHANOV, A. A.
Energy balance of a biogeocenosis
N71-33512
- MOLDAVSKA, S. I.
Typological features of human higher nervous
activity and their significance in professional
selection
A71-37775
- MOLDOPSKY, P. J.
Research on avalanche type semiconductor radiation
detectors Semiannual report, Jul. - Dec. 1970
[NYO-3246-TA-8] N71-33775
- MOLE, P. A.
Disclosure by dietary modification of an
exercise-induced protein catabolism in man
A71-38552
- MONGE, C.
Urinary protein excretion in high-altitude
residents
A71-38561
- MOORE, P. D.
Estimation of total skeletal mass in man by
radioisotope dilution
N71-33259
- MORGAN, P. A.
Behavioural awakening in response to indoor sonic
booms
[ISVR-TR-41] N71-32865
- MOROWEY, W. F.
Selected bivariate anthropometric distributions
describing a sample of naval aviators, 1964
[AD-723796] N71-31942
- MOROZOVA, E. M.
Effect of conditions of space flight on station
'Zond-5' on seeds, onions, and tradescantia
plants
A71-39605
- MORRIS, J. D., JR.
Red blood cell and plasma volumes in the burro,
Equus asinus - Desert and mountain
A71-38560
- MOSKVIN, E. V.
Results of the combined action of vibration and
gamma irradiation on chlorella
A71-39237
- MOUGEY, E. H.
Renin, norepinephrine, and epinephrine responses
to graded exercise
A71-38551
- MUNDIE, J. R.
Encoding function of syncoders Final report, Mar.
1967 - Mar. 1968
[AD-724072] N71-33329
- MUNRO, E. M.
L-dopa - Disaggregation of brain polysomes and
elevation of brain tryptophan
A71-38979
- MURRAY, R. H.
Hypogravic and Hypodynamic Environments
[NASA-SP-269] N71-33251
- MUYERS, K.
Alveolar-arterial O₂-pressure difference during
hyperventilation
A71-38200

N

- NATOCHIN, IU. V.
Relation between the elimination of various
cations by the kidneys during a disturbance of
the salt balance
A71-39232

- NEAL, C. B.
Identification of human operator models by
stochastic approximation A71-37648
- NELSON, T. M.
Hue shifts produced by intermittent stimulation A71-38283
- NICHIPOROVICH, A. A.
Photosynthesis and the productivity of cenoses N71-33510
- NICHOLSON, T.
Man's response to the space environment A71-37492
- NILSSON, T. H.
Hue shifts produced by intermittent stimulation A71-38283
- NIXON, C. W.
Some effects of noise on man A71-38959
- NORDIN, B. E. C.
Assessment of bone mass in relation to inactivity N71-33256
- NORREY, D. V.
Spectral sensitivity of macaque cones determined
with an ERG method
[IZP-1971-10] N71-33823
- NOVIKOVA, S. P.
Influence of prolonged hypokinesia on the
serotonin metabolism of rats A71-39218



- OELSZNER, W.
An analogous electronic functional model of the
external functions of primary biological
receptor elements A71-38894
- OGDEN, E.
Transmission of small pressure waves in the canine
vena cava A71-38987
- OHANLON, J. G.
Some effects of the vibration of reading material
upon visual performance
[ISVR-TR-49] N71-32864
- OLLENDORFF, P.
Unsymmetrical diffusion along the nerve path as a
model of synapsis activity A71-37250
- OLSON, R. L.
Effects of aeolian erosion on microbial release
from solids
[NASA-CR-121422] N71-33380
- OSIPOV, V. P.
Automatic regulation of the volumetric blood flow
rate during artificial blood circulation A71-38641
- OVECHKIN, V. G.
Reflex activity of spinal marrow in intact and
labyrinthectomized animals subjected to radial
accelerations A71-39221
- OVERFIELD, E. M.
Diffusion component of alveolar-arterial oxygen
pressure difference in man A71-38556

P

- PADNOS, P.
Spectral sensitivity of macaque cones determined
with an ERG method
[IZP-1971-10] N71-33823
- PALETS, B. L.
Investigation of a mathematical model of the
cardiovascular system A71-37777
- PARFENOV, G. P.
Results of biological studies performed on the
Zond 5, Zond 6, and Zond 7 stations A71-39134
- PATRICK, L. M.
Living human dynamic response to minus G sub x
impact acceleration. 2 - Accelerations measured
on the head and neck
[AD-717130] N71-31616
- PAULY, H.
Mechanism of absorption of ultrasound in liver

- tissue A71-39770
- PEACOCK, J. L.
Human psychomotor performance in a rotating
environment as measured by the Langley complex
coordinator and the decision response time
devices
[AIAA PAPER 71-887] A71-37275
- PEAKE, W. T.
Intracochlear potential recorded with micropipets.
I - Correlations with micropipet location. II -
Responses in the cochlear scalae to tones. III -
Relation of cochlear microphonic potential to
stapes velocity A71-39768
- PELLIER, A.
Analysis of the factors determining the slow
variations in heart rate during and after muscle
exercise A71-38891
- PERAESALO, J.
Right heart, pulmonary, and left heart blood
volumes determined by analogue computer analysis
of radiocardiograms in normal subjects and
patients with mitral stenosis A71-38801
- PETERSEN, W. J.
Relative frequency distribution of D sub 125 C
values for spore isolates from the Mariner- Mars
1969 spacecraft A71-37646
- PETROV, I. A.
Utilization of color-music during the performance
of an operator under conditions of isolation A71-39225
- PETROV, T. A.
Nature and distribution of intraocular pressure in
healthy persons ages 25 - 40 engaged in mental
work N71-33469
- PETROV, YU. A.
Use of color-music in an operator's work during
isolation N71-33460
- PETROVA, T. A.
Nature of the distribution of intraocular pressure
in healthy humans from 25 to 40 years old
engaged in intellectual work A71-39234
- PETUKHOV, B. M.
Electrical activity of the muscles of the shin
during standing after a 120-day bed rest A71-39230
- Electric activity of leg muscles during standing
after a 120-day bedrest confinement N71-33465
- PEVZNER, L. Z.
Total content of protein and the quantity of basic
proteins in the neurons and neuroglia of the
supraoptical and red brain nuclei of rats during
natural sleep and when deprived of the
paradoxical phase of sleep A71-38545
- PFLUG, I. J.
Environmental microbiology as related to planetary
quarantine. Semiannual progress report, 1 Jun.
1970 - 30 Nov. 1970
[NASA-CR-119638] N71-31601
- PICHOTKA, J. P.
Alveolar-arterial O₂-pressure difference during
hyperventilation A71-38200
- PIEMME, T. E.
Effects of bed rest on forearm vascular responses
to tyramine and norepinephrine N71-33264
- Effects of two weeks of bed rest on carbohydrate
metabolism N71-33269
- PIIPER, J.
Analysis of test gas washout from lungs with
varying tidal volume - Theory A71-38565
- POLIEVSKII, G. A.
Investigation of motor reaction parameters A71-37447
- POLIEVSKII, S. A.
Investigation of motor reaction parameters A71-37447

- POKHETOV, I. D.
Changes in cardiac ejection caused by 15-day bed rest
A71-39231
- PORTUGALOV, V. V.
Cultivation of mammalian cells at 'suboptimal' temperatures
A71-39220
- POTENKIN, B. A.
Effects of vibration on humans investigated
N71-32090
- POZA, F.
A study of sensitivity to noise Final report [EQ-71-4]
N71-32572
- PSHENNIKOVA, M. G.
Dynamics of noradrenaline concentration in the myocardium of rats subjected to high-altitude hypoxia
A71-37393
- PUKITE, A. H.
Enzyme activity in terrestrial soil in relation to exploration of the Martian surface Semiannual progress report [NASA-CR-121446]
N71-33232
- PURAKHIN, I. U. N.
Electrical activity of the muscles of the shin during standing after a 120-day bed rest
A71-39230
- PUTHAN, D. P.
Composition and concentrative properties of human urine [NASA-CR-1802]
N71-32520
- PYAVCHENKO, H. I.
Importance of biogeocenology in land reclamation
N71-33513

R

- RAAG, V.
Review of thermoelectric conversion in micro/milliwatt power range for bio-medical applications
A71-38912
- RADL, G. W.
Anthropotechnology [DLR-HITT-70-11]
N71-33970
- RADLIFF, H. H.
Physiological evaluation of subjects exposed to a cold water environment while wearing different protective suit assemblies Interim report [AD-724617]
N71-32907
- RADOMSKI, H. W.
A study of possible biochemical mechanisms involved in hyperbaric oxygen-induced changes in cerebral gamma-aminobutyric acid levels and accompanying seizures
A71-38970
- RAHELFS, V. W.
A psychometric study of the annoyance caused by noise
A71-38061
- RAZGOVOROV, B. L.
Influence of abdomen and head shielding during gamma-irradiation of dogs on the content of protein fractions in the blood serum
A71-39222
- REGAN, D.
Independence of evoked potentials and apparent size
A71-38281
- RENFREW, J. W.
Effects of long-term shock and associated stimuli on aggressive and manual responses
A71-39070
- RENNI, D.
Urinary protein excretion in high-altitude residents
A71-38561
- RICE, C. G.
Behavioural awakening in response to indoor sonic booms [ISVR-TR-41]
N71-32865
- RICE, T. W.
Renin, norepinephrine, and epinephrine responses to graded exercise
A71-38551
- RICHARDS, W.
Independence of evoked potentials and apparent size

- RICKUS, G. H., JR.
Replacement air group performance as a criterion for naval aviation training [AD-718848]
N71-31621
- ROBISON, S.
Action of pharmacologic agents in experimental cardiac tamponade
A71-38968
- ROSHANOV, V. S.
Morphological changes in the myocardium under the action of accelerations for several hours
A71-39235
- ROSENBLATT, L. S.
The summation-dial, a vectorial representation of time series data
A71-39480
- ROWLANDS, C. H.
Visual sensations produced by cosmic ray muons
A71-38677
- RUSIN, V. IA.
Interrelation between the indices of general and tissular resistance of rats /in the case of muscular training, adaptation to cold, and administration of dibazol/
A71-39219
- RUSIN, V. YA.
Correlation among the indices of general and tissue resistance in rats /during muscle training, adaptation to the cold and dibazol injections
N71-33454
- RUSSELL, H.
Visually evoked cortical responses to the on- and off-set of patterned light in humans
A71-38282

S

- SACHS, R. G.
K/plus/, osmolality and subcutaneous adipose tissue blood flow
A71-39379
- SAIDEL, G. M.
Pulmonary gas transport characterization by a dynamic model
A71-39441
- SAKAI, A.
Frequency distribution of the heart sounds in normal man
A71-38803
- SALTIN, B.
Diet, muscle glycogen, and endurance performance
A71-38554
- SANTA MARIA, L. J.
Physiological evaluation of subjects exposed to a cold water environment while wearing different protective suit assemblies Interim report [AD-724617]
N71-32907
- SANTAMBROGIO, G.
Occurrence of a deep breath after a period of airway occlusion
A71-39040
- SAPUNTSOV, L. E.
Correlation analysis of the electrical activity of human respiratory muscles
A71-38198
- SASSI, G.
Effect of alkalosis on performance and lactate formation in supramaximal exercise
A71-38888
- SCHAAF, A.
A psychometric study of the annoyance caused by noise
A71-38061
- SCHAEFER, H. J.
Radiation exposure in air travel
A71-38976
- SCHAEFER, K. E.
The effect of chronic hypercapnia on oxygen affinity and 2,3-diphosphoglycerate
A71-39440
- SCHEID, P.
Analysis of test gas washout from lungs with varying tidal volume - Theory
A71-38565

- SCHMID, P. G.
Effects of bed rest on forearm vascular responses
to tyramine and norepinephrine N71-33264
- SCHWABER, E.
Distribution of cholesterol and esterified
cholesterols in the human skin A71-38892
- SCHOTTE, J.
Alveolar-arterial O₂-pressure difference during
hyperventilation A71-38200
- SCHROEDER, D. J.
Alcohol and disorientation related responses. 1 -
Nystagmus and vertigo during caloric and
optokinetic stimulation N71-32079
[FAA-AM-71-6]
Alcohol and disorientation-related responses. 3 -
Effects of alcohol ingestion on tracking
performance during angular acceleration N71-32433
[FAA-AM-71-20]
- SCHROLL, H.
Action of pharmacologic agents in experimental
cardiac tamponade A71-38968
- SCHULZ, P.
On the question of pilot injury during low
altitude flight N71-31888
- SCHULZE, E.
Applied electroencephalography in aviation
medicine as functional diagnosis of central
regulations A71-38223
- SCHWAN, H. P.
Mechanism of absorption of ultrasound in liver
tissue A71-39770
- SEDDING, I.
The growing importance of a psychological basic
training for stewardesses A71-38224
- SEMESEKO, V. E.
Isolation and identification of physiologically
active substances of indole nature in
extracellular metabolites of *Chlorella* A71-38544
- SHAPRANOVA, E. I.
Stop test method for the study of movement control
processes A71-37569
- SHAPIRA, J.
An index for describing food utility A71-37575
- SHARONOVA, I. N.
Microelectrode studies of convergence of signals
of various sensory modalities on brain neurons A71-38197
- SHASHKOV, V. S.
Influence of prolonged hypokinesia on the
serotonin metabolism of rats A71-39218
- SHAVEB, J. A.
Effects of bed rest on forearm vascular responses
to tyramine and norepinephrine N71-33264
- SHEVELEV, I. A.
Functional significance of primary responses in
subcortical visual centers A71-37443
- SHIELDS, J. L.
Alterations in serum and extracellular
electrolytes during high-altitude exposure A71-38562
- SHIPOV, A. A.
One property of the summary characteristics of
vestibular nystagmus A71-39238
One property of the overall characteristics of
vestibular nystagmus N71-33473
- SHOSTAK, V. I.
Characteristics of threshold electric phosphene
A71-37444
- SILETSKAIA, L. A.
Optimization of the mineral composition of the
nutrient medium for hydrogen bacteria A71-39236
- SIROTZKY, L.
Urinary protein excretion in high-altitude
residents A71-38561
- SKAVENSKI, A. A.
Extraretinal correction and memory for target
position A71-38286
- SKINNER, W. S., JR.
K⁺/plus/, osmolality and subcutaneous adipose
tissue blood flow A71-39379
- SKREBITSKII, V. G.
Microelectrode studies of convergence of signals
of various sensory modalities on brain neurons A71-38197
- SMALL, G. D.
Effects of ultraviolet radiation on algae -
Mechanisms of inactivation and repair Annual
progress report, 1 May 1970 - 30 Apr. 1971
[COO-1793-J] N71-33577
- SMIESKO, V.
Unidirectional rate sensitivity component in local
control of vascular tone A71-39378
- SMITH, D. P.
Derivation of wavelength discrimination from
colour-naming data A71-38285
- SMITH, M. J.
Living human dynamic response to minus G sub x
impact acceleration. 2 - Accelerations measured
on the head and neck N71-31616
[AD-717130]
- SMITH, R. C.
A non-verbal technique for the assessment of
general intellectual ability in selection of
aviation personnel N71-32434
[FAA-AM-71-28]
- SOHNER, H. S.
Intracochlear potential recorded with micropipets.
I - Correlations with micropipet location. II -
Responses in the cochlear scalae to tones. III -
Relation of cochlear microphonic potential to
stapes velocity A71-39768
- SOKOL, E. A.
Changes in human retinal blood circulation under
transversely directed acceleration A71-39228
- SORVACHEVA, Z. L.
Cultivation of mammalian cells at 'suboptimal'
temperatures A71-39220
- SOUTH, P. E.
Simulation of passive thermal behavior of a
cooling biological system - Entry into
hibernation A71-38199
- Chronic catheterization and handling procedures
for marmots A71-38568
- SPARKS, K.
Determinants of marathon running success A71-38890
- STALNAKER, R. L.
Mechanical properties of the head N71-32547
- STAVRO, W.
Planetary quarantine considerations for outer
planet missions [AAS PAPER 71-122] A71-37917
- STEADMAN, B. L.
Determining respiratory rate and volume from ECG
R-wave amplitude modulation Final report, 1970
[AD-713833] N71-31614
Electrocardiogram R-wave amplitude detector
Technical report, Oct. 1968 - Apr. 1970
[AD-712668] N71-31622
- STEADMAN, R. G.
Indices of windchill of clothed persons A71-39205
- STEENEKEN, H. J. M.
Visual troubles, dustproof and acoustic qualities
as they are met with perforated wall covering
[IZF-1971-12] N71-33725
- STEINBACH, M. J.
Adaptation to displaced vision - A change in the
central control of sensorimotor coordination

- STEPLOCK, D. A.
Maximal aerobic and anaerobic power and stroke
volume of the heart in a subalpine population
A71-37543
- STOCKWELL, C. W.
Evidence for a test of dynamic otolith function
considered in relation to responses from a
patient with idiopathic progressive vestibular
degeneration
[AD-722318] N71-31768
- STOLWIJK, J. A. J.
A mathematical model of physiological temperature
regulation in man
[NASA-CR-1855] N71-33401
- STORK, E. J.
Determination of alpha-tocopherol in freeze dried
foods by a modified colorimetric procedure
Final report 1 Oct. 1969 - 30 Apr. 1970
[AD-713829] N71-31610
- STRELKA, V. V.
Amino silica gels - Regeneratable sorbents for
absorbing carbon dioxide, hydrogen sulfide, and
water vapor
A71-39233
- STROBEL, M.
The influence of spatial intervals and thickness
of lines of stimulus patterns on stabilized
images
A71-38280
- STUMM, J. E.
Configuring the orbital centrifuge systems for
space shuttle compatibility
[AIAA-PAPER 71-860] A71-37274
- SUMMITT, J. K.
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 3 - Saturation
depth 300 feet
[AD-723172] N71-32602
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 4 - Saturation
depth 500 feet, saturation depth 600 feet
[AD-723173] N71-32632
Repetitive excursion dives from saturated depths
on helium-oxygen mixtures. Phase 2 - Saturation
depth 200 feet, saturation depth 150 feet
[AD-723171] N71-32770
- SUSHKOV, P. V.
Cultivation of mammalian cells at 'suboptimal'
temperatures
A71-39220
Cultivation of mammal cells at 'suboptimum'
temperatures
N71-33455
- SVARTS, S. S.
Population structure of biogeocenoses
N71-33503
- SYZANTSEV, I. U. K.
Influence of abdomen and head shielding during
gamma-irradiation of dogs on the content of
protein fractions in the blood serum
A71-39222
- T**
- TATE, C.
On modelling neural networks in the retina
A71-38276
- TAUTS, M. I.
Isolation and identification of physiologically
active substances of indole nature in
extracellular metabolites of Chlorella
A71-38544
- TAYLOR, D. M.
Effects of aeolian erosion on microbial release
from solids
[NASA-CR-121422] N71-33380
- TEICHNER, W. H.
Predicting human performance 2 - Laws of the
visual reaction time
[AD-724001] N71-33087
- TENENBAUM, L. A.
Stop test method for the study of movement control
processes
A71-37569
- THARP, G. D.
Tissue respiration changes in chronic exercise -
Comparison with responses to other types of
stresses
- THOMAS, D. J.
Living human dynamic response to minus G sub x
impact acceleration. 2 - Accelerations measured
on the head and neck
[AD-717130] N71-31616
- THOMAS, J. P.
Patterns of spatial integration in the detection
of compound visual stimuli
A71-38277
Evidence of role of size-tuned mechanisms in
increment threshold task
A71-38278
- THURMOND, J. B.
Effects of figural noise, rotation, and other task
variables on the visual perception of form
[AD-723992] N71-33187
- TIKHOIROV, B. A.
Station investigations of tundra biogeocenoses
N71-33504
- TOLHURST, G. C.
Revised tables of appropriate oxygen percentages
for selected partial pressures at various depths
Final research report
[AD-724282] N71-33125
- TRIEBWASSER, J. H.
The effect of total body exercise on the
metabolic, hematologic, and cardiovascular
consequences of prolonged bed rest
N71-33265
- TRINDER, J. C.
Effects of image blur and lateral inhibition in
the visual system on visual performance
A71-38059
- TROSHIKHIN, V. O.
Typological features of human higher nervous
activity and their significance in professional
selection
A71-37775
- TSUCHIDA, Y.
Positive and negative deflections in the off
response of the electroretinogram in man
A71-38058
- TUMANOV, G. V.
Reflex activity of spinal marrow in intact and
labyrinthectomized animals subjected to radial
accelerations
A71-39221
- TYURYUKANOV, A. N.
Experimental biogeocenology
N71-33506
- U**
- UTEUSH, E. V.
Registering structure as a memory model and its
role in perception processes
N71-32014
- V**
- VAN STEE, E. W.
Spontaneous cardiac arrhythmias induced by
bromotrifluoromethane
[AD-723645] N71-31733
- VANDEN DRIESSCHE, T.
Possible diversity in basic mechanisms of
biological oscillations
A71-39476
- VANDERNOTEN, P.
Evolution of some circulatory, respiratory, and
metabolic parameters during physical exercise
performed in a noisy environment
A71-38889
- VEGTE, J. H.
Cold sea survival
[NASA-CR-121449] N71-33718
- VEICSTEINAS, A.
Maximal aerobic and anaerobic power and stroke
volume of the heart in a subalpine population
A71-38887
- VEIZADES, N.
An improved cell volume analyzer
A71-38824
- VILLANUEVA, R. P.
Determination of alpha-tocopherol in freeze dried
foods by a modified colorimetric procedure
Final report 1 Oct. 1969 - 30 Apr. 1970
[AD-713829] N71-31610

- VINBERG, G. G.
Biogeocenology of the water environment
N71-33511
- VINOGRAD, L. I.
Information model displaying the process involved
in piloting aircraft
[AD-723051] N71-32566
- VIORETS, O. A.
Relation between the elimination of various
cations by the kidneys during a disturbance of
the salt balance
A71-39232
- VOGEL, J. E.
Changes in bone mineral content of the os calcis
induced by prolonged bed rest
N71-33267
- VOGT, H. L.
Anthropotechnology
[DLR-MITT-70-11] N71-33970
- VOGT, J. J.
Analysis of the factors determining the slow
variations in heart rate during and after muscle
exercise
A71-38891
- VOKONAS, P. S.
Diastolic heart sounds and filling waves in
coronary artery disease
A71-37550
- VON GIERKE, H. E.
Disuse atrophy in Macaca Mulatta and its
implications for extended space flight
N71-33260
- VON KLITZING, L.
Cyclic phenomena in biological and biochemical
systems
A71-39475
- VORONIN, L. L.
Microelectrode studies of convergence of signals
of various sensory modalities on brain neurons
A71-38197
- VORONKA, G. SH.
Total content of protein and the quantity of basic
proteins in the neurons and neuroglia of the
supraoptical and red brain nuclei of rats during
natural sleep and when deprived of the
paradoxical phase of sleep
A71-38545

W

- WAHLBERG, J. L.
Prediction of Army aviator performance -
Description of a developing system
[AD-724696] N71-33148
- Peer ratings as predictors of success in military
aviation
[AD-724695] N71-33149
- WATSON, W. J.
A study of possible biochemical mechanisms
involved in hyperbaric oxygen-induced changes in
cerebral gamma-aminobutyric acid levels and
accompanying seizures
A71-38970
- WEBB, P.
Deconditioning and its prevention by simulating
the hydrostatic gradient
N71-33274
- WEISS, B. F.
L-dopa - Disaggregation of brain polysomes and
elevation of brain tryptophan
A71-38979
- WEISS, T. F.
Intracochlear potential recorded with micropipets.
I - Correlations with micropipet location. II -
Responses in the cochlear scalae to tones. III -
Relation of cochlear microphonic potential to
stapes velocity
A71-39768
- WERTS, M. F.
Scientific publications and presentations relating
to planetary quarantine. Volume 5 - The 1970
supplement
[NASA-CR-121325] N71-32231
- WESTERMAN, K.
An analogous electronic functional model of the
external functions of primary biological
receptor elements
A71-38894

- WEVER, R.
Continuous recording of human rectal temperature
under extreme conditions
A71-39041
- WHEDON, G. D.
Metabolic studies of the Gemini 7 14-day orbital
spaceflight
N71-33255
- WILKINSON, D. A.
Visual-motor control loop - A linear system
A71-37544
- WILLIAMS, R. A.
Diastolic heart sounds and filling waves in
coronary artery disease
A71-37550
- WINAND, J.
Amino acid levels in plasma, liver, muscle, and
kidney during and after exercise in fasted and
fed rats
A71-38982
- WINGET, C. E.
The summation-dial, a vectorial representation of
time series data
A71-39480
- WOLF, P. L.
An improved cell volume analyzer
A71-38824
- WOOD, E. H.
Regional differences in pleural and esophageal
pressures in head-up and head-down positions
A71-38564
- WOOD, J. D.
A study of possible biochemical mechanisms
involved in hyperbaric oxygen-induced changes in
cerebral gamma-aminobutyric acid levels and
accompanying seizures
A71-38970
- WOOD, M. E.
Improved crew member training through a new
philosophy toward training
[AD-723313] N71-31741
- WOOLFSON, M. M.
On modelling neural networks in the retina
A71-38276
- WUNDER, C. C.
Water intake and urine output of mice during
chronic centrifugation
A71-38984
- Immersion techniques and the evaluation of
spaceflight deconditioning countermeasures
N71-33272
- WURTHAN, R. J.
L-dopa - Disaggregation of brain polysomes and
elevation of brain tryptophan
A71-38979

Y

- YAKOVLEVA, I. YA.
Characteristics of the nasal vascular system
reaction during 120-day hypokinesia
N71-33464
- YATES, W. G.
Transmission of small pressure waves in the canine
vena cava
A71-38987
- YOUNG, A. T.
Seeing and scintillation
A71-38571
- YOUNG, G. A.
Effects of long-term shock and associated stimuli
on aggressive and manual responses
A71-39070
- YOUSEP, M. K.
Red blood cell and plasma volumes in the burro,
Equus asinus - Desert and mountain
A71-38568

Z

- ZAGORUYKO, N. G.
Auditory pattern recognition
[JPRS-53606] N71-32009
- ZATZMAN, M. L.
Chronic catheterization and handling procedures
for marmots
A71-38568
- ZAVIALOV, A. V.
Correlation of the activity of adjacent neurons of

PERSONAL AUTHOR INDEX

ZOLLINGER, R. H., JR.

- the somatosensory zone of the cat cortex
A71-37392
- ZDOR, S. YE.
On a synthesis of search type scanning systems
N71-32034
- ZHUKOVA, G. N.
Stop test method for the study of movement control
processes
A71-37569
- ZIMMERMANN, B.
An analogous electronic functional model of the
external functions of primary biological
receptor elements
A71-38894
- ZINK, R. A.
Continuous recording of human rectal temperature
under extreme conditions
A71-39041
- ZIPRIAN, B.
Plasma renin activity in essential hypertonic and
normotonic persons exposed to exogenous stress
A71-38893
- ZISKIN, M. C.
Encoding function of syncoders Final report, Mar.
1967 - Mar. 1968
[AD-724072]
N71-33329
- ZOLLINGER, R. H., JR.
Estimation of total skeletal mass in man by
radioisotope dilution
N71-33259

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA deposits its technical documents and bibliographic tools in eleven Federal Regional Technical Report Centers located in the organizations listed below. Each center is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA

University of California, Berkeley

COLORADO

University of Colorado, Boulder

DISTRICT OF COLUMBIA

Library of Congress

GEORGIA

Georgia Institute of Technology, Atlanta

ILLINOIS

The John Crerar Library, Chicago

MASSACHUSETTS

Massachusetts Institute of Technology, Cambridge

MISSOURI

Linda Hall Library, Kansas City

NEW YORK

Columbia University, New York

PENNSYLVANIA

Carnegie Library of Pittsburgh

TEXAS

Southern Methodist University, Dallas

WASHINGTON

University of Washington, Seattle

NASA publications (those indicated by an "*" following the accession number) are also received by the following public and free libraries:

CALIFORNIA

Los Angeles Public Library

San Diego Public Library

COLORADO

Denver Public Library

CONNECTICUT

Hartford Public Library

DELAWARE

Wilmington Institute Free Library, Wilmington

MARYLAND

Enoch Pratt Free Library, Baltimore

MASSACHUSETTS

Boston Public Library

MICHIGAN

Detroit Public Library

MINNESOTA

Minneapolis Public Library

James Jerome Hill Reference Library, St. Paul

MISSOURI

Kansas City Public Library

St. Louis Public Library

NEW JERSEY

Trenton Public Library

NEW YORK

Brooklyn Public Library

Buffalo and Erie County Public Library

Rochester Public Library

New York Public Library

OHIO

Akron Public Library

Cincinnati Public Library

Cleveland Public Library

Dayton Public Library

Toledo Public Library

OKLAHOMA

Oklahoma County Libraries, Oklahoma City

TENNESSEE

Cossitt-Goodwin Libraries, Memphis

TEXAS

Dallas Public Library

Fort Worth Public Library

WASHINGTON

Seattle Public Library

WISCONSIN

Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 750 Third Avenue, New York, New York, 10017.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the National Lending Library for Science and Technology, Boston Spa, Yorkshire, England. By virtue of arrangements other than with NASA, the National Lending Library also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols "#" and "*", from: ESRO/ELDO Space Documentation Service, European Space Research Organization, 114, av de Neuilly, 92-Neuilly-sur-Seine, France.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON, D.C. 20546

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

FIRST CLASS MAIL

POSTAGE AND FEES PAID
NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION



POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return

"The aeronautical and space activities of the United States shall be conducted so as to contribute . . . to the expansion of human knowledge of phenomena in the atmosphere and space. The Administration shall provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

— NATIONAL AERONAUTICS AND SPACE ACT OF 1958

NASA SCIENTIFIC AND TECHNICAL PUBLICATIONS

TECHNICAL REPORTS: Scientific and technical information considered important, complete, and a lasting contribution to existing knowledge.

TECHNICAL NOTES: Information less broad in scope but nevertheless of importance as a contribution to existing knowledge.

TECHNICAL MEMORANDUMS:
Information receiving limited distribution because of preliminary data, security classification, or other reasons.

CONTRACTOR REPORTS: Scientific and technical information generated under a NASA contract or grant and considered an important contribution to existing knowledge.

TECHNICAL TRANSLATIONS: Information published in a foreign language considered to merit NASA distribution in English.

SPECIAL PUBLICATIONS: Information derived from or of value to NASA activities. Publications include conference proceedings, monographs, data compilations, handbooks, sourcebooks, and special bibliographies.

TECHNOLOGY UTILIZATION PUBLICATIONS: Information on technology used by NASA that may be of particular interest in commercial and other non-aerospace applications. Publications include Tech Briefs, Technology Utilization Reports and Technology Surveys.

Details on the availability of these publications may be obtained from:

SCIENTIFIC AND TECHNICAL INFORMATION OFFICE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Washington, D.C. 20546